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Time's Telescope

FOR

1819;

OR,

A Complete Guide to the Almanack:

CONTAINING AN EXPLANATION

OF

SAINTS' DAYS AND HOLIDAYS;

WITH ILLUSTRATIONS OF BRITISH HISTORY AND ANTIQUITIES,

NOTICES OF OBSOLETE RITES AND CUSTOMS,

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AND

THE NATURALIST'S DIARY;

EXPLAINING THE VARIOUS

APPEARANCES IN THE ANIMAL AND VEGETABLE KINGDOMS.

WITH

A Description of Fruit Trees.

TO WHICH IS PREFIXED

An Introduction,

CONTAINING A

COMPENDIUM OF CHEMISTRY.

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Advertisement.

THE encouragement which the Publishers of Time's Telescope *have experienced from a liberal Public, brings them, in the* rising *of a new volume, to their* Sextilis; *and they trust that their renewed endeavours to secure and improve that favour, which they estimate so highly, will not forsake them ere they reach their* BIS-SEXTILIS, *or even the protracted series. According to our Frontispiece,* Astronomy *and* Biography, *together with the* Seasons, *have brought their wonted offerings to* TIME, *who, in his turn, selects the choicest of them, and presents them with a grateful heart before his numerous votaries, assuring them, that neither the exertions of himself, nor of his friends, shall be aught remitted till* TIME SHALL BE NO MORE.

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'We are glad to see that the Editors of this useful work find encouragement to continue it annually, and that the articles it contains increase in their interest.'—*Gentleman's Magazine for August* 1816.

Notices of Time's Telescope for 1817.

'We have already noticed the preceding volume of this amusing and instructive performance; and we have now little to add to or deduct from the encomiums which we deemed it our duty to pass on the contents of that part; the plan being still the same, and the execution and arrangement as nearly as possible on the same model. We shall not consider it as requisite for us to continue our report of this annual publication.'—*Monthly Review for August* 1817.

'The Almanack, in order to be reduced to a cheap and convenient form, has become so enigmatical, that a more enlarged explanation of its contents and references is very desirable; and such is the purpose of the "Time's Telescope," which appears to us to be executed in a very amusing way, and the Astronomical portion of it is prepared evidently by a person of science.'—*Critical Review for December* 1816.

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'The industry of the compiler has been successfully exerted in the collection of an entertaining, and, in many respects, useful mass of materials.'—*Antijacobin Review for December* 1816.

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Notices of Time's Telescope for 1818.

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'Time's Telescope for 1818 deserves the same praise, and is entitled to the same support and encouragement, which the former volumes have received from the public.'—*British Critic for December* 1817.

'The present volume is quite equal in entertainment and instruction to any that have preceded it.'—*Gentleman's Magazine for November* 1817.

Introduction.

A COMPENDIUM of CHEMISTRY.

SURROUNDED by an infinity of substances differing in their natural forms, and endued with essentially different properties, the contemplative mind cannot but seek for the gratification of learning the respective combinations of matter on which these innumerable varieties depend. To assist in this most pleasing and interesting enquiry, we offer to our readers a comprehensive sketch of the several facts and observations which are at present known and admitted. In presenting this, we trust, acceptable, offering to our readers, it is gratifying to remark, that we shall place before them a brief but compendious system of CHEMISTRY, which teaches the constituent principles of bodies, the results of their various combinations, and the laws by which those combinations are effected.

The common atmospheric *air* which we breathe, and the simple *water* which we drink, heretofore considered as elementary substances, are now known to be compound substances, into the composition of which different aërial or gaseous matters enter.

CALORIC, or the matter of heat, may be considered as a substance of very considerable chemical influence. It appears to be highly elastic, subtle, and impon-

derable. It unites chemically with all bodies, in a quantity proportioned to their affinity with it. From its elasticity it seems to oppose the attraction of cohesion, and to separate the particles of matter. By the prevalence of its influence *solid* bodies become *fluid*, and these assume a *gaseous form*. It is constantly tending, by its diffusion, to form an equilibrium of temperature. Bodies through which it is thus transmitted are termed *conductors of caloric*.

Different bodies require different quantities of caloric to render them of a similar temperature. This property is termed the *capacity for heat*, and the quantity thus required is called *specific heat*. Whilst thus in union, and not manifesting itself, it is termed *combined caloric*, or, according to Dr. Black, *latent heat*; but when perceptible it is termed *free caloric*, or *sensible heat*.

LIGHT is an elastic fluid, being reflected from bodies which it cannot penetrate. Passing near to any substance, it is more or less attracted, and suffers a proportionate degree of inflection. In passing through *media* of different densities it suffers different degrees of refraction. This is always found to be greatest in combustible bodies; and hence Sir Isaac Newton suspected the diamond to be a combustible body.

Its influence on the vegetable kingdom is very obvious; indeed, its chemical affinities are so numerous and powerful, that few substances are free from its influence.

ATMOSPHERIC AIR is formed by the union of *oxygen* and *nitrogen*, always in the proportion of 73 of the former to 27 parts of the latter.

1. OXYGEN GAS is colourless and elastic, but becomes fixed in numerous bodies, from which it may be extricated by the application of such substances as have a superior degree of affinity with the bases with which it was united. Thus it may be obtained from black manganese, as it is called, by adding to it the acid of sulphur, and by applying heat to the mixture.

Oxygen combines with other bodies in different quantities and modes, and hence result different states of those bodies. When in the smaller quantities an *oxide* is formed, possessing no acid properties; and in the larger, *acids* are produced. From the combination of acids with metals, earths, &c. *salts* are formed, and which by the termination *ate* are designated as holding their full dose of oxygen; and by the termination *ite*, are marked as holding a minor dose.

Various oxides may be also formed with different doses of oxygen, and these are marked by prefixing the Greek numeral to the term oxide, the higher the number the higher the degree of oxidation being implied. Thus *protoxide* is the first oxide, with a *minimum* of oxygen. Then follows *deutoxide*, *tritoxide*, &c. to *peroxide*, or last oxide, holding the *maximum* of oxygen.

Oxygen is that part of the common air which is

necessary to respiration and combustion. By the process of combustion, or of breathing, carried on in a confined vessel, this gas will be abstracted, and the remaining gaseous matter is

2. AZOTIC or *NITROGEN GAS*. It is colourless and elastic. It stops combustion, and destroys animal life, when breathed in a pure state. From the union of azote with oxygen, in the proportion of 30 to 70, an acid is formed, which is termed *nitric acid*. This combination may take place with three different doses of oxygen. When the dose of oxygen is complete, *NITRIC ACID* is formed, being a yellow and highly corrosive fluid: it acts with great power on many other bodies, and parts with its oxygen with great readiness. That part of the acid which thus loses a portion of its oxygen escapes in a gaseous form, and is then called *NITROUS GAS*, consisting of nitrogen united with a diminished portion of oxygen.

On mixing with the atmosphere, it assumes the appearance of a yellow vapour, from its union with the oxygen of the atmospheric air, and with the moisture it may contain. By this acquisition of oxygen, it may again become nitric acid.

A combination, in which the proportion of oxygen to azote is still lower, is formed by allowing nitrous gas to stand for some days over iron filings. It will thus be materially changed. It no longer becomes yellow on being mixed with atmospheric air, and it now supports combustion, so that bodies will burn

in it with a considerable degree of splendour. It is now called the *gaseous oxide of azote*. The salts formed from this acid are termed *nitrates*.

Atmospheric air, it should be remembered, is constantly formed, in every situation, of certain and constant proportions of the oxygen and azotic gas. It also contains generally a little more than a thousandth part of *carbonic acid gas*, of which we will next treat.

If charcoal be heated in a closed vessel of oxygen gas, it takes fire, and the whole is consumed. The bulk of the gas remains the same, but part of it is changed to a gas of a different kind. It will not support flame, and is destructive of animal life, on being respired. Lime-water absorbs it, and is thereby rendered of a milky hue. It hence appears that a peculiar substance, the chief constituent of the charcoal, has by the process of combustion entered into combination with the oxygen, and has formed an acid gas of a peculiar kind.

The substance yielded by the charcoal, and which appears to have been its chief constituent, is termed CARBON, and the acid gas which it forms by this union is termed, 3. CARBONIC ACID GAS. This gas is obtained in nearly the same manner from the burning of the *diamond*, or of *plumbago*, commonly called *black-lead*. The salts formed by this acid are termed *carbonates*.

WATER is formed by the union of *oxygen* with another gaseous substance.—4. HYDROGEN. Its

existence in water is thus manifested. Water in a state of vapour being made to pass over iron wire made red hot, the oxygen of the water combines with the iron, and the water disappearing, the hydrogen gas remains. Being mixed with half its bulk of oxygen gas, and fired with the electric spark, the mixture explodes, the gases disappear, and water is formed. It is twelve times as light as common air, and when properly confined, as in a *balloon*, rises through the air, as a bubble of common air does through water. Mixed with a small portion of oxygen, it burns with brilliancy, as when united with the oxygen in the common air, in what are termed the *gas-lights;* but with a larger proportion of oxygen it explodes. It enters into the formation of many animal and vegetable substances, from which it is evolved during their decomposition. It also exists in many mineral substances, from which it is separated by different processes.

From stagnant water, luminous and other vapours are evolved: among these a combination of carbon and hydrogen may be first noticed. It was formerly termed *heavy inflammable air*, but is now named *CARBURETTED HYDROGEN GAS*. It is highly inflammable, and burns with a yellow brilliant flame; and, under certain circumstances, fires with an explosion.

From these naturally formed vapours becoming spontaneously luminous, it is very likely that a portion of phosphorus may sometimes enter into their

composition. This is rendered probable, from its being well known that a phosphorescent light is sometimes yielded by the natural decomposition of urine, and of other animal substances; independent of those luminous appearances unconnected with the presence of phosphorus, as in the instances of decaying fish, rotten wood, &c. It is, indeed, far from being improbable, that in the laboratory of nature, where decomposition and reformation are proceeding on so large a scale, and in so powerful a degree, the hydrogen gas may become impregnated with phosphorus, and form the PHOSPHURETTED HYDROGEN of the chemists; and that this may concur in the formation of ignes fatui, or will of the wisps, &c.

To enable our readers the better to judge of this question, we will give a brief history of this substance. PHOSPHORUS is a yellowish, semi-transparent substance, which, when exposed to the air, emits a white smoke, smelling like garlick. If heated to 148° it takes fire, and burns with a brilliant white flame, and abundance of white smoke. This smoke being collected, is found to be a peculiar acid, termed *PHOSPHORIC ACID*, having been formed by the accession of oxygen to the phosphorus, during its combustion. But the oxygen may be combined with the phosphorus in a less quantity, and thereby form the *oxide of phosphorus*. Its compounds with other bodies are termed *phosphurets;* and the gas to which we referred in the former paragraph, being a compound of hydrogen with phosphorus, is termed *phosphuretted hydrogen gas*,

and fumes spontaneously on coming in contact with the atmospheric air. The salts formed with this acid are termed *phosphates*.

Agreeing so nearly in its combustibility with the substances just treated of, SULPHUR or *brimstone* may be very properly examined in this place. It is of a yellow colour, hard and brittle, and of but little taste. It yields its peculiar smell on being very little heated. At 170° it sublimes in a fine powder, termed *flowers of sulphur*; at 218° it melts, and at 560° it boils; the vapour kindles, and if the fumes are collected, a ponderous acid liquor is obtained, which is the *sulphuric acid*. When the acid is obtained under circumstances occasioning a less portion of oxygen to combine with the sulphur, the product is termed *sulphurous acid*. The salts in the former case are termed *sulphates*, and in the latter, *sulphites*.

It readily combines with hydrogen gas, forming *sulphuretted hydrogen gas*, which is colourless, and smells like rotten eggs. When an additional portion of sulphur is forced into this compound, *supersulphuretted hydrogen* is formed.

Sulphur readily combines, too, with phosphorus, forming a compound which is very combustible, and often takes fire spontaneously. As this compound may be formed in different proportions, its appellation varies accordingly. If the proportion of sulphur is largest, it is termed *phosphuret of sulphur*; and if the phosphorus exceeds, *sulphuret of phosphorus*.

We must here notice another combustible sub-

stance, for the discovery of which we are indebted to our celebrated countryman Davy. It is named Boracium, and was obtained by an ingenious process from the *acid of borax*, yielded by the *borax* of commerce, which is a *borate of soda*, a combination of boracic acid with a large proportion of soda. Boracium is an opake, brittle substance, of a dark olive colour. It burns when slightly heated, and with considerable brilliancy, especially in oxygen or chlorine.

From the *water of the ocean*, sea salt may be obtained, which yields peculiar products. If sea salt is mixed with black oxide of manganese, and distillation employed, a gas is obtained of very important properties. It is of a yellowish green colour, and incapable of being respired. It will, however, support combustion, and even produce it in phosphorus, antimony, &c. It destroys vegetable colours, and is therefore highly useful for bleaching. It was considered as being a compound of muriatic acid and oxygen, and was named *oxymuriatic acid;* but Sir H. Davy ascertained that it does not contain any oxygen, and, concluding it to be a peculiar simple substance, named it, from its colour, Chlorine.

Chlorine combines with oxygen, thus becoming a gas of a yellow colour, and manifesting properties very different from those of chlorine. It is named by its discoverer, Davy, Euchlorine. It is obtained by the action of chlorine, in a liquid form, on a salt termed hyper-oxy-muriate of potash. When heated

it decomposes, light and heat being produced. It is composed of two parts, in volume, of chloric gas and one of oxygen.

Chlorine combines readily also with hydrogen, and thus forms the substance named MURIATIC ACID. It is formed by about one part of hydrogen to thirty-five of chlorine. In a gaseous form it is colourless, has a pungent and peculiar smell; it cannot be respired, nor will it support combustion. It mixes eagerly with water, forming *liquid muriatic acid.* The salts formed by this acid, combining with different bases, are called *muriates.*

Chlorine combines with many other bodies, forming substances of peculiar properties. These substances are designated as containing chlorine by the termination *ane.* Thus we have *phosphorane, sulphurane,* &c.

Equal parts of chlorine gas and carbonic oxide gas being exposed to a strong light, they combine, and a gas is formed of just half the bulk of the two gases. This peculiar gas was named by its discoverer, Dr. John Davy, PHOSGEN GAS, from its being formed by the action of light.

FLUORIC ACID, possessing very uncommon properties, is obtained from the mineral kingdom only. It is yielded from that combination of it with lime, which is termed fluor spar, and exists in large quantities in Derbyshire. Sulphuric acid being poured on this substance, fluoric acid gas is yielded. It is colourless, it cannot be respired, nor will it support

combustion. It fumes on being exposed to the air, and greedily absorbs water. But its most curious property is that of dissolving glass with extraordinary rapidity; and hence it is employed for etching on glass. On fluoric acid gas being distilled in glass vessels, it dissolves the flint, which is retained in the gas, deposited on the surface, when it comes in contact with water.

The important discoveries of our illustrious countryman, Davy, have occasioned some difficulties as to the arrangement which should be adopted for the substances of which we have next to treat. These, until his discoveries, were considered as simple substances, earths and alkalies; but by his experiments the greater part of these substances have been found to be compounds, of which new and hitherto unknown metals were the bases. But, as it will be more instructive and more interesting, we shall consider these bodies under their former designations, and in the same order in which they have hitherto been disposed; especially since, by so doing, we shall have the opportunity of noticing the remarkable discoveries to which we have alluded.

ALKALIES.—1. AMMONIA, or *volatile alkali*, formed, in a gaseous state, of three parts in bulk of hydrogen gas and one part of azote, is acrid and pungent to the smell and taste. It cannot be breathed, nor will it allow combustion in it. It may be obtained in a solid or a fluid form, when it is known as *ammonia*, or as *liquid ammonia*, commonly called *spirits of hartshorn*. Mixed with oxygen and exposed

to the electric spark, a combustion and decomposition ensue. If chlorine be employed instead of oxygen, it burns with considerable splendour.

It appears from a curious experiment that the basis of ammonia is a metal; and this assumed metal has been named AMMONIUM. Ammonia appears to be a combination of this metal with oxygen.

2. POTASH, or *vegetable fixed alkali,* is yielded by the ashes of vegetables that grow inland. It is very acrid and corrosive, acts on the skin, and changes vegetable blues green. Mixed with phosphorus and distilled, *phosphuretted hydrogen gas* is yielded, possessing the property of taking fire on coming in contact with the air. Aided by the galvanic battery, Davy demonstrated the metallic base of potash. It is a white, soft, malleable metal, which forms alloys with the other metals. It is lighter than water, or, indeed, than any known liquid. Sp. grav. 0,885. It rapidly seizes on oxygen, and then becomes potash, which appears to be composed of 86 parts of the metal and 14 of oxygen. The metal is named POTASSIUM.

3. SODA, or *mineral fixed alkali,* is found ready formed in the earth, and is obtained from the ashes of marine plants. It agrees with potash in most of its properties. Like potash, our countryman found it to be formed of a peculiar metal in combination with oxygen. This metal he found to be white and solid, but very malleable, and so soft as to weld, merely by pressure. It is lighter than water. Sp. gr. 0,9348. Soda appears to be formed by 78 parts

of the metal and 22 of oxygen; its affinity with which appears to be similar to that of potassium. This metal is named SODIUM.

The EARTHS are nine in number, four of which, lime, magnesia, barytes, and strontian, are of an alkaline nature: the other five neither neutralize acids, nor produce any change on vegetable blues.

1. ALUMINE, is white, and when pure has neither taste nor smell. It exists in a great proportion in clay, to which it gives ductility. With sulphuric acid it forms sulphate of alumine, or the *alum* of commerce, from which it may be obtained in a pure state by precipitation. Although its metallic base has not yet been demonstrated, its existence is highly probable.—2. YTTRIA is found in a Swedish mineral, named gadolinite. It is obtained from this substance in a white powder, having neither taste nor smell. It is also supposed to be a metallic oxide.—3. GLUCINA is found in the beryl and the emerald. It is also a soft white powder, without taste or smell. It is also presumed to have a metallic base.—4. ZIRCONIA is found in the mineral called zircon, and in the hyacinth. It is a white powder, with a harsh feel. It is supposed to be a metallic peroxide.—5. SILICA chiefly contributes to the formation of siliceous minerals, as *quartz, rock-crystal, flint*, &c. It is obtained in a white powder without taste or smell, and of a very harsh feel; it also is supposed to have a metallic base.—6. LIME is the chief constituent of marble, chalk, limestone, &c. It

may be obtained pure by burning these substances. It is white, moderately hard, acrid, and corrosive; changes vegetable blues green, and approaches in its properties to the fixed alkalies. Water being applied to it, combines with it and becomes solid, heat being evolved. This is called *slacking*, the combination being a *hydrate of lime*. Water will dissolve rather less than 0,002 of its weight of lime. Davy discovered the metal of lime; it is only four or five times heavier than water, solid and white like silver; it burns with brilliance, leaving its oxide lime behind. The metal is named CALCIUM.—7. MAGNESIA is a soft white powder; it is also a metallic oxide. Its metal, which is white, and sinks rapidly in water, has been named MAGNIUM.—8. BARYTES is yielded by a mineral known by the name of *ponderous spar*, is porous, and of a greyish white. It is more caustic than lime, and is a violent poison. It may be slacked like lime, thus becoming a *hydrate of barytes*. Its base is now known to be a white solid metal, four or five times heavier than water, and is named BARIUM.—9. STRONTIAN, which is obtained from its carbonate or sulphate, is porous, of a whitish grey colour: it is acrid, and has alkaline properties. Its metal, named STRONTIUM, nearly resembles barium.

We shall now proceed to the metals which were known before the discoveries of Davy: these are twenty-seven in number.—1. GOLD, of a yellow colour, high lustre, and the most ductile and malleable of all known bodies. Sp. gr. 19,376. When

melted, it is of a bluish green colour.—2. PLATINUM is white, but not so bright as silver. It is as hard as iron, and very ductile and malleable. It is the heaviest of all bodies, sp. gr. being, at least, 23. Neither gold nor platinum will unite with sulphur.—3. SILVER, is of a fine white, and capable of a very high polish, and is next to gold in malleability and ductility. Sp. gr. about 10,510.—4. MERCURY, or *quicksilver*, is white, and has a considerable degree of lustre. It is fluid except when cooled down to 39° below *zero*, when it becomes solid, and is then malleable. It boils at 656°, its vapour being invisible. It amalgamates and combines with most metals.—5. PALLADIUM is a white metal, resembling platinum. Sp. gr., when hammered, 11,871. It is malleable, breaks with a crystalline texture, and, when strongly heated, its surface becomes of a blue colour. It was discovered by Dr. Wollaston, and obtained by him from crude platina.—6. RHODIUM is white; its sp. gr. exceeds 11. No known degree of heat will melt it alone. Its oxide is of a yellow colour, and mixed with salt, of a deep red. It also was obtained by Dr. Wollaston. Platinum and palladium, when combined with gold, destroy its colour, but rhodium does not.—7. IRIDIUM was discovered by Mr. Smithson Tennant, in crude platina. It is white, and much resembles platinum. It strongly resists the action of acids; its solution in muriatic acid becomes first blue, then green, and lastly a deep red.—8. OSMIUM was also discovered by Mr. Tennant. It is of a dark grey or blue colour, and possesses a

metallic lustre. It is unaltered by heat in close vessels, but is soon dissipated in the open air. It is easily oxidized by heat, in the open air; its oxide having an oily appearance and a peculiar smell.—9. COPPER is of a fine red colour, but soon tarnishes. When melted it is of a bluish green colour. Sp. gr. about 8,9. It is very malleable and ductile. Our silver coin consists of 12½ of silver alloyed with 1 of copper; the alloy being harder than silver alone. —10. IRON is of a bluish white colour, and is one of the hardest of the metals. Its sp. gr. is from 7,6 to 7,8. It is malleable and ductile. It is attracted by the loadstone, and is itself the constituent substance of the loadstone. Its combination with sulphur exists native, and is the *magnetic pyrites*. *Cast* or *pig iron* is its name, when first extracted from the ore: when it is either *white*, which is hard and brittle; *grey*, which is softer and less brittle; or *black*, which is the softest and most fusible. By long melting and repeated forging it is rendered *soft*, or *wrought iron*; and if kept red hot for some time, in a bed of charcoal, it is converted into *steel*.—11. NICKEL is obtained from a German ore, called kupfer nickel, or false nickel: it resembles copper, though none can be got from it. It is white like silver: sp. gr. 8,820. It is softer than iron, malleable both cold and hot: and, like steel, may be converted into a magnet, by which it is powerfully attracted. This metal is constantly found in the *meteoric stones* which fall from the sky.—12. TIN, which is of a bluish white; sp. gr., when ham-

mered, 7,299. Not so hard as silver. It is very malleable, but not equally ductile or tenacious: it crackles in being beat, and melts at 442°, cooling in rhomboidal crystals. From different alloys with copper are formed *bell metal, mirrors for telescopes, bronze* and *gun metal*.—13. LEAD is also of a bluish white, but very soon tarnishes; it is very soft. Sp. gr. 11,407. It is very malleable; but its ductility and tenacity are not great. It renders gold brittle as glass, and renders silver and platinum also brittle.—14. ZINC is of a bright white, rather harder than silver; sp. gr. when hammered 7,1908. It soon tarnishes, and when heated red hot, it burns and is converted into a white oxide, which flies off in white flakes, the *oxide* or *flowers of zinc*. Zinc combines with copper, and forms *brass*. This combination is with the oxide; but when the metal itself is employed, the result is *pinchbeck*, or *prince's metal*.—15. BISMUTH. It is of a reddish white, and harder than silver. Sp. gr. 9,822. It has but little malleability, and is not so ductile as to allow of being drawn into a wire. It renders most of the metals brittle; but eight parts being mixed with five of lead and three of tin, *fusible metal*, as it is called, is produced, which melts at 212°.—16. ANTIMONY is of a greyish white, and brilliant. It is hard as silver, and very brittle. Sp. gr. 6,712. Heated in an open vessel, it flies off in a white oxide, *flowers of antimony*, in the form of smoke. The alloy of tin and antimony forms *pewter*; and of lead and antimony, *me-*

tal for printers' types.—17. TELLURIUM. It is brilliant, of a bluish white, and very brittle. It melts at a degree of heat a little above that for melting lead. It has been discovered by Davy, that it will combine with hydrogen and form a gas, soluble in water, and having the characters of a weak acid.—18. ARSENIC is of a bluish white; brilliant, but soon tarnishes. It is remarkably soft and brittle. It sublimes without melting at 356°, smoking and emitting an odour like garlic. Sp. gr. 8,31. *White arsenic,* as it is called, is the ordinary white oxide. It is white, compact, and of a glassy appearance. Exposed to heat, it emits a smoke, and its peculiar smell is like that of garlick. It is one of the most virulent poisons. It is formed of 75,2 of arsenic, and 24,8 of oxygen. The peroxide, which is also white, but sourer and more soluble than the preceding, is known as *arsenic acid.* It is composed of 65,4 of arsenic, and 34,6 of oxygen. —19. COBALT is not very brilliant; it is a greyish colour, shaded with red. It is brittle, and reducible to powder. It is about the hardness of silver, and is susceptible of magnetic influence. Sp. gr. 7,7. It forms three oxides. The *protoxide* is of a blue colour, the *deutoxide* is of an olive colour, and the *peroxide* is black.—20. MANGANESE is of a greyish colour, appearing like cast iron. It is brittle, and so hard as only just to bear the file. Sp. gr. 8,013. It combines rapidly with oxygen, forming three oxides; the *protoxide,* which is green; the *deutoxide,* or *brown oxide;* and the *peroxide* or *black oxide,* which is found

native, in great quantities.—21. CHROMIUM. Its colour is white; sp. gr. 5,90. It is very brittle, is of a good polish, and magnetic. It melts only in a very high temperature: on being heated in the open air, it becomes oxidized. The *protoxide* is green, the *deutoxide* is brown; and the *peroxide* or *chromic acid* is of a red or rather orange colour, and is found in red-lead ore, and contains one part chromium and two of oxygen.—22. TELLURIUM is found in Saxony, in an ore named *peckblende*. It is of an iron grey colour; sp. gr. 9,000. It yields to the file; but can only be fused by the highest degrees of heat. It is said to form four oxides.—23. MOLYBDENUM. It has been obtained only in a granular form. Sp. gr. 8,611. It is brittle, and of a silvery white. Its *protoxide* is brown; the *deutoxide* is of a violet brown. By increasing the heat it is farther oxidized, and becomes blue, manifesting several acid properties. It then consists of 100 parts metal, and 34 oxygen, and is called *molybdous acid*. On being farther oxidized it becomes white, and is termed the *molybdic acid*.—24. TUNGSTEN is of a greyish white, and brilliant. Sp. gr. 17,6. It is brittle, very hard and very difficult of fusion. It forms two oxides; the *protoxide* or *blue*, and the *peroxide* or *yellow* oxide.—25. TITANIUM. It is extremely refractory; is brittle, but yet somewhat elastic. It has some lustre, and is of the colour of copper. The *protoxide* is blue or purple; the *deutoxide*, composed of 100 metal and 33 oxygen, is red; and the

peroxide, with two parts metal and one of oxygen, is white. — 26. COLUMBIUM was discovered by Mr. Hatchett, in a mineral from America. He procured from it a metallic oxide, but could not obtain it in a metallic form. It is supposed to be the same substance which Ekeberg, a Swedish chemist, discovered, and to which he gave the name of *TANTALIUM*.—27. CERIUM was discovered by Hisinger and Berzelius. They were only able to obtain it in the state of oxide, being foiled in every attempt to reduce it to a metallic state.

The Vegetable Kingdom.

Whether we regard the numerous processes performing in the systems of different vegetables, or consider the various essentially different products which result from them, the vegetable kingdom offers us manifold beautiful instances of the chemistry of nature.

Water may be esteemed the chief pabulum of vegetables, which reducing it to its first principles, appropriate its hydrogen and oxygen to the formation of their respective constituent parts. Air, light, and heat, aid the several processes, whilst the application of manure not only adds to the quantity of nutriment, but at the same time stimulates the vegetating principle to increased action. The SAP appears to be, in vegetables, what the blood is in animals: from this the other humours are secreted. It differs somewhat in different vegetables, but always contains water, mucus, sugar, gum, extractive matter, tannin,

&c.: principles from which nature separates several useful and surprising productions. Thus, MUCUS is secreted in large quantities in the leaves of mallows, in quince and lint-seed, and in different bulbs, as of the hyacinth, white lily, &c. This mucus, which had hitherto been thought to be similar to gum, has been ascertained by Dr. Bostock to be really different from it. GUM exudes from different trees, varying in its properties, with the trees from which it exudes; such are the *gum arabic* and *tragacanth*. ALBUMEN, a substance resembling white of egg, has also been found in many vegetables, particularly in the *papaw-tree*, or *carica papaya*. Even FIBRIN, well known to exist in the blood and flesh of animals, is found in the same tree which yields albumen. Wheat-flour, too, yields a substance named GLUTEN, which very much resembles the animal membrane or tendon, and, when dry, has much the appearance of glue. It is obtained by kneading wheat-flour in water: this substance remaining in the hand, whilst the water will be found to contain STARCH, which has also been yielded by the flour: starch is also found in many seeds and bulbous roots. SUGAR abounds in many vegetable substances, particularly in grapes, parsnips, and beet-root. It is most plentifully yielded by the sugar-cane, *arundo saccharifera*. It is first obtained in a fluid state, and by long boiling is deposited in crystals, when it is said that it *grains*. The *molasses* or fluid-sugar being drained from these grains, they are termed *raw-sugar*; and

this being properly purified and clarified, becomes *loaf-sugar*. MANNA may be considered as a species of sugar. It is obtained from various trees, from which it exudes spontaneously in the summer months: sometimes the exudation being promoted by incisions made into the tree. It is chiefly obtained from Sicily and Calabria, from the *fraxinus ornus*, a species of *ash*. *Jelly*, a soft tremulous substance, is yielded by the juices of currants and of several other fruits. It would be well to remember, that, when long boiled, these juices lose their power of forming into a jelly. The *ulmus nigra*, a species of elm, exudes a substance, which the celebrated Klaproth first examined. It appears like gum, but is of a black colour, with considerable lustre. It is solid and hard; its powder is of a brown colour, and it dissolves readily in the mouth, and is tasteless. The *inula helenium*, or *elecampane*, yields also a peculiar substance, which appears like starch: being rubbed in cold water, it gives to it an opaline appearance, but if suffered to rest, falls in the form of a white powder. It is also precipitated in the same manner, after having been actually dissolved in boiling water. To this substance has been given the name of INULIN. That most valuable colouring substance, INDIGO, of so much use in the art of dyeing, is obtained from different species of plants termed *indigofera*, and mostly from that species which is named *tinctoria*. These plants are steeped in water until fermentation takes place, by which

the water assumes a green colour. The water now being agitated for some time, lime water is added to it, when blue flocculi, which is the indigo, subside, and the collected masses are dried for use. In many vegetables, a remarkably strong bitter taste is discoverable, as in the *hop*, *quassia*, and *gentian*. This is supposed to proceed from the presence, in these plants, of a peculiar vegetable substance, which has been named the BITTER PRINCIPLE, although it has not yet been obtained pure and distinct in a separate state. A substance has been formed by the action of the nitric acid in different vegetable substances, which, from the peculiar properties it possesses, has obtained the name of the ARTIFICIAL BITTER PRINCIPLE. TANNIN, of so much use in the preparation of leather and in dyeing, is obtained from nutgalls, the barks of different trees, and from several other vegetable substances, by infusion and subsequent deposition. It is of a brown colour and an astringent taste, and is soluble in water. If this solution be mixed with a solution of gelatine or glue, the two substances unite, and a precipitate of tannin and gelatine falls. It is on this combination that the process of tanning depends. Tannin combines with most of the metallic oxides, and strikes therewith different colours. Hence its use in *dyeing*, *ink-making*, &c. Added to solutions of iron, it forms a purple or deep black. Mr. Hatchett has ascertained that charcoal, of either vegetable or animal substances, if digested with nitric acid, will yield a substance, which, as it is capa-

ble of tanning leather like nut-galls, oak-bark, &c., is termed ARTIFICIAL TANNIN. EXTRACT, or *the extractive substance*, is that substance which is obtained in the residuum of evaporated vegetable infusions or decoctions, and separated from jelly, gum, &c.—The extracts of different vegetable substances differ considerably from each other; but at the same time agree in possessing a slight degree of acidity, and, when liquefied, of yielding a precipitate, if mixed with ammonia.—The NARCOTIC PRINCIPLE: Several plants possess the power of occasioning sleep, and others even of thus causing death. This property exists in the most considerable degree in *opium*, which is yielded by the white poppy, *papaver album*. By appropriate processes a substance is obtained from opium, which is supposed to be the narcotic principle. It is white, crystallizes in rectangular prisms, has neither taste nor smell, and possesses several peculiar chemical properties. Its right to be considered as the narcotic principle, is evinced by its possessing the soporific qualities of the opium itself. OILS, both *fixed* and *volatile*, are found abundantly in plants. The *fixed* oils are found in the seeds of cotyledonous plants: it is most commonly obtained from the almond and the olive, and from rape-seed and linseed. The *volatile* oils are found in almost all the different parts of plants, particularly of those which yield a peculiar odour, such as lavender, mint, roses, &c. WAX may be considered as a vegetable production, since it has been

ascertained that the varnish with which the upper side of the leaves of many trees are covered possesses all the properties of bees-wax, which is prepared by the bees from honey or sugar. *Bees-wax* is of a yellow colour, and of a peculiar odour; but on being duly exposed to the atmosphere, it loses both its colour and its peculiar smell, and is then the *white-wax* of the shops. CAMPHOR is obtained by distillation from the wood of a tree named *laurus camphora*. Camphor has been found in several other plants, and, by saturating oil of turpentine with muriatic acid gas, a substance in crystals is obtained, which, from the properties it possesses, has been named *artificial camphor*. BIRD-LIME: This strongly tenacious and adhesive substance appears to be chiefly formed by that substance to which the name, bird-lime, may be given, as denoting this peculiar principle. It is not soluble in water, but combines readily with oils, and does not enter into combinations with alkalies. It possesses also many other chemical properties which distinguish it from other vegetable substances. It is yielded spontaneously by the epidermis of a plant termed *robinia viscosa*: and is artificially procured from the middle bark of the holly, by fermentation, washing, &c. CAOUTCHOUC, so remarkable for its elasticity, and so generally used for the removal of pencil and even other markings from paper, exudes from some species of *hævea* and *jatropha*, trees growing in South America, and is said to be also produced by several trees in the East

Indies. It is insoluble in water; but dissolves in the volatile oils, which, on separation, leave it in a glutinous state. On the contrary, ether and rectified petroleum dissolve it, and leave it unaltered. RESINS are solid, brittle substances; mostly of a yellowish colour, and possessing some degree of transparency. Their taste is rather acrid; they melt with heat, and, if fired, emit a strong yellow flame with much smoke. They exude from various trees, and differ considerably from each other according to the tree from which they proceeded. Thus we have *rosin, turpentine, mastick, elemi, tacamahac, animi*, &c. *Copal* differs in many respects from the preceding. Its solution is a most beautiful varnish. LAC is deposited on different trees of East India, by an insect called *chermes lacca*. When this substance is adherent to the twigs on which it has been formed, it is called *stick-lac*; when detached, *seed-lac*; and when melted and disposed in a thin crust, it is termed *shell-lac*. It is used for sealing wax, and for the purposes of varnish. GUM RESINS, *myrrh, galbanum, olibanum*, &c., are actually combinations of gum and resin. They are chiefly used in medicine. They have somewhat of a fatty appearance, are not so combustible as resins, nor do they melt so readily. COTTON, which is that soft downy substance which envelopes the seeds of various plants, is chiefly obtained from a species of *gossipium*. CORK is the outer bark of the *quercus suber*, or cork-tree, and differs in many respects from other vegetable substances.

WOOD is chiefly formed by that part of vegetables which is termed the *woody fibre*, and which exists also in the leaves, the capsules of fruits, and even in some of the more delicate parts of vegetables.

Oxygen, carbon, and hydrogen, are the principles generally found in plants, with the fixed alkalies, some of the metals, and the earths, lime, magnesia, alumina and silica: the latter is supposed to form the largest part of the epidermis of some of the canes.

Vegetable substances, subjected to FERMENTATION, produce, under different circumstances, either WINE, from which ALCHOL may be obtained, or the ACETIC ACID, termed vinegar. Besides which, the following acids may be obtained from vegetables, and which can be here only enumerated: Benzoic, citric, gallic, malic, oxalic, phosphoric, prussic, tartaric, &c.

BITUMENS are certain bodies, which have considerable resemblance to resins and oils, and which are found in subterraneous situations. From the examination of these bodies, it appears that they are of vegetable origin.

They sometimes occur in a fluid state, resembling the volatile oils. NAPHTHA is a yellow and transparent fluid, volatile, strongly smelling, and very light. PETROLEUM resembles naphtha, except in colour, it being of a darkish brown, probably from the deposition of carbon. Bituminous substances exist also in every degree almost of solidity: when acquiring a small degree of thickness, it is termed *mineral*

tar, *maltha*, and *mineral caoutchouc*; and when still harder, it is called *asphaltum*. In Devonshire a substance is found which accompanies the *bovey coal*, which Mr. Hatchett has ascertained to be composed of resin 55, asphaltum 41, and earth 3; and has named it *retinasphaltum*. JET is also a bituminous substance, holding much carbon. *Cannel coal* is of the same class, but contains more earth. *Common coal* has its bituminous constituent intersected by plates of carbonate of lime and sulphuret of iron.

The Animal Kingdom.

Animal substances, although containing some of the same principles found in the vegetable kingdom, still manifest considerable differences in their respective analyses. As we have already done in the vegetable kingdom, so we shall here, in the first place, take a view of those substances which enter into the composition of different animal substances, and then enter into the consideration of some of these individually.

GELATINE; *jelly*, employed in the arts as *glue*, is abundantly obtained from the skin of animals. It is soluble in water, and is precipitated therefrom, by the addition of tannin, in a substance composed of tannin and gelatin; as has been already noticed, when speaking of tannin.

ALBUMEN, as has been already observed, is that substance which forms what is termed the white of

eggs. It is coagulated by heat, by acids, and, though in a less degree, by alcohol. Dr. Bostock, who has made some most important experiments on the more simple animal substances, observes, that one part of dried albumen dissolved in nine parts of water, forms a solution which becomes perfectly solid when exposed to heat equal to its coagulation; and that *one drop* of a saturated solution of oxymuriate of mercury dropt into water holds $\frac{1}{1000}$ part of its weight of albumen, produces milkiness, and a subsequent precipitate. MUCUS has been determined by the same chemist to be instanced in the thickening substance contained in saliva, and yields a precipitate on the addition of nitrate of silver, and more fully by acetate of lead. FIBRIN, or the *fibrous part of the blood*, is obtained from the muscles of animals, or by agitation and washing of clotted blood; thus is yielded a white fibrous substance, without taste or smell. UREA is a yellow crystalline substance, of a peculiar smell and taste, obtained from urine. SACCHARINE MATTER, not, perhaps, exactly agreeing with the sugar of vegetables, is formed in animal processes. *Honey* may be, perhaps, justly asserted to be of vegetable formation, and to have undergone but little change by the *bee*; but *milk* may be made to yield a syrup, from which sugar-like crystals may be obtained, and which have been named *sugar of milk*. A substance approaching still nearer to vegetable sugar is found in large quantities in the urine of

patients afflicted with *diabetes*. Substances also are formed in animals approaching so nearly to resins, as to merit the name of ANIMAL RESINS. Under this head may be placed the *resin of bile, castor,* and *ambergris*. BONES are formed of cartilage, gelatine, and fat, deriving their hardness from the earthy salts which exist in them abundantly. These are phosphate and carbonate of lime, and perhaps a small proportion of magnesia. SHELLS are formed of the salts of lime, deposited on animal matter disposed in lamellæ. In bones, the *phosphate of lime* is most abundant; but in shells, the carbonate of lime prevails. CRUSTS of *lobsters, crabs,* &c. which are termed crustaceous animals, are also formed of animal matter, blended with calcareous salts. But in the crusts of animals the proportions of the calcareous salts differ from those of bones and of shells, being, as it were, intermediate; the quantity of the phosphate of lime being larger, and of the carbonate less than in shells; and the carbonate being in larger, and the phosphate in less proportion, than in bones. HORNS contain a very small portion of earthy matter; the albumen and gelatine, which enter into their composition, are therefore very abundant. Hence, by the well managed employment of heat and moisture, they may be rendered so soft and flexible as to be bent into different shapes, and even impressed by moulds for various useful and ornamental purposes. The NAILS, CLAWS, and HOOFS of different animals being composed of the same con-

stituents as horns, differ in very few respects from them. The MUSCLES, or the *flesh* of animals, contain albumen, gelatine, and extractive matter, but are chiefly composed of fibrin. The SKIN is divisible into the *cuticle, epidermis* or *scarf-skin,* and the *cutis* or *true skin.* The former appears to consist chiefly of coagulated albumen, and the latter of gelatine: hence, it may be observed, that it is this part from which the jelly is obtained. The MEMBRANES appear to possess most of the chemical properties of the cutis. The TENDONS, those substances in which the muscles terminate, are also resolvable by boiling into jelly; showing that it is gelatine which chiefly enters into their composition. The nature of the substance of the BRAIN and NERVES has not yet been satisfactorily ascertained.—OILS: the oily substances of animals is found under various modifications in different animals and in different parts of the same animal: thus *spermaceti* is found in the head of the *physeter macrocephalus,* or spermaceti whale; whilst from its blubber is obtained *train oil.* The *fat* of some animals, as of the ox and sheep, becomes a hard substance, whilst that of hogs is much softer, and is therefore called *hog's-lard.* MARROW, which is contained in the long bones of animals, is an animal fixed oil, of peculiar properties, somewhat resembling butter. HAIR, which exists in the different forms of *down, wool,* and *bristles,* varies in appearance in animals, though, perhaps, but little in its composition. The notice of this analysis will

serve to show how impossible it would have been to compress the analysis of the different substances mentioned in this Compendium. The component parts of *black* hair are, 1. A peculiar animal matter, constituting the greatest part.—2. White solid oil, in small quantity.—3. Greyish green oil, in larger quantity.—4. Iron.—5. Oxide of manganese.—6. Phosphate of lime.—7. Carbonate of lime.—8. Silica.—9. Sulphur. FEATHERS appear much to resemble hair in their component parts. The *quill*, Mr. Hatchett has shown, is chiefly formed of hardened albumen. BLOOD seperates, on standing, into *cruor* or *coagulum*, and the *serum* or fluid part. The *CRUOR* contains *fibrin*, which is manifested in a white, solid, and elastic form, by washing the clot: and *the colouring matter* of the blood, which was long supposed to be iron, but which Mr. Brande has shown to be of an animal nature. The *SERUM* is a fluid of a greenish yellow, which coagulates at 156°, and is divisible into *albumen* and *serosity*. The blood contains water, fibrin, albumen, benzoic acid, hydrosulphuret of ammonia, soda, subphosphate of iron, muriate of soda, phosphate of soda and of lime. Dried blood, calcined with potash, dissolved and added to solution of sulphate of potash, deposits a green precipitate, which, being digested in muriatic acid, becomes that beautiful pigment *Prussian blue*, and which, by proper chemical treatment, yields an acid, the *Prussic acid*, possessing peculiar properties.

Milk is secreted in the *mammæ* of females of the class of mammalia, and differs in some respects in

different animals, but agrees in its general properties; so that the properties of cows' milk may be assumed as illustrative of those of milk in general. On the surface of milk at rest, a thick unctuous yellow substance collects, named *cream*. This being removed, and *rennett*, yielded by the inner membrane of the calf's stomach, being added to the remaining milk, it soon separates into *curd* and *whey*. *CREAM* being agitated by churning, separates into a milky fluid, called *butter-milk*, and the *oil* of the milk, as *butter*. The *CURD*, separated by coagulation, and subjected to pressure, forms *cheese*. BILE, secreted by the liver of animals into the gall-bladder, is of a dark yellowish green colour, of an unctuous feel, a peculiar smell, and a bitter taste. It contains a resin, and a substance peculiar to bile, named *picromel*, a whitish solid substance formed into globules, with water and salts, chiefly phosphate of lime, muriate, sulphate, and phosphate of soda. CERUMEN, *or wax of the ear*, is supposed to resemble the resin of bile. SALIVA contains, with some of the salts just mentioned, mucilage and albumen; the latter being only in a state of diffusion. URINE, as it cools, yields a peculiar urinous smell, and deposits a sediment varying under different circumstances. The characterising substance of urine is termed *urea*, which yields the *uric acid*; and which, combined with soda, forms the general saline deposit of urine. During fevers and diseases of the liver, a rose-coloured sediment is deposited, found to contain an acid named *rosacic*. Besides albumen and resin, urine also contains va-

rious salts, resulting from the combination of the acids already mentioned, and benzoic, acetic, and phosphoric acids, with soda, ammonia, lime, or magnesia. TEARS, and MUCUS, and the HUMOURS OF THE EYE, SYNOVIA, and the rest of the animal fluids, differ so little in their constituent parts, as not to demand particular notice in this Compendium.

It is necessary to observe, that animal as well as vegetable substances yield, besides the constituents already mentioned, a great number of peculiar acid products, which contribute to the vast range of physical and chemical properties which these bodies possess.

We shall now proceed to a description of some processes and instruments employed in chemical experiments. Solid substances are reduced into powders by trituration, pulverization, and levigation. Brittle substances are pulverized by means of hammers, pestles and mortars, stones and mullers. Pestles and mortars are made of metal, glass, porcelain, marble, agate, &c., according to the hardness and properties of the bodies to be reduced to powder.

The separation of the finer parts of bodies from the coarser is performed by means of *sifting* or *washing*. Sieves are well known instruments, made of different degrees of fineness, according to the purposes for which they are wanted. *Washing* is used for procuring powders of an uniform fineness, much more accurately than can be done by a sieve;

but it can only be employed for such substances as are not acted upon by the fluid which is used. The powdered substance is well mixed with water, or other fluid; the liquor is allowed to settle for a few moments, and is then decanted off; the coarsest powder remains at the bottom of the vessel, and the finer parts pass over with the liquor. By various decantations in this way, several sediments are obtained of different degrees of fineness, the last being the finest.

Filtration is a finer species of sifting, performed through the pores of paper, flannel, fine linen, sand, &c. It is used only for separating fluids from solids. No solid, even in the form of powder, will pass through the above-named filtering substances; of course, if water or other fluid, containing sand, insects, mud, &c., be placed in a bag or hollow vessel, made of any of those substances, the sand or other solids will remain upon the filter, and the liquor will pass through. Unsized paper is a very convenient substance for making filters for chemical purposes. It is wrapped into a conical form, and put into a glass funnel, which serves to strengthen the paper and support the weight of the fluid when poured into it.

Evaporation separates a fluid from a solid, or a more volatile fluid from another which is less volatile. Various degrees of heat are employed in evaporation, according to the nature of the substances. It is performed in vessels of wood, glass, metal, porcelain, &c. Basons made of Wedgewood's ware

are extremely convenient, as they are not apt to break by sudden changes of heat. Small flasks of thin glass are likewise well adapted to the purposes of evaporation: these are placed either over the naked fire, or in a vessel filled with sand, which is then called a sand-bath. This affords a more regular degree of heat, and prevents the vessels from being broken. When the fluid which goes off in the act of evaporation is to be preserved, the operation is called distillation.

Distillation is the evaporating in close vessels when we wish to separate two fluids of different degrees of volatility, and to preserve the most volatile, or both of them. The substance to be distilled is put into a vessel that will resist the action of heat, called a retort, an alembic, or still, having a neck projecting from it, to which is attached another vessel to receive the fluid that rises first, which is called the receiver. The vessel that contains the liquor to be distilled is placed upon the fire, or in a sand-bath, or over a lamp: the heat causes the most volatile fluid to rise in the form of vapour, which passes into the receiver, where it is again condensed by cold. In many cases the condensation is assisted by immersing the tube, through which the vapour passes, in a vessel containing cold water.

In plate Chemistry, *fig.* 1, AB represents a retort used for distillation: it is made of glass, baked earth, &c. When it has a small neck *a* with a stopple fitted to it for introducing materials, it is called a tubulated retort. D is the receiver for condensing the

hich is raised, and into which the neck of

the retort is inserted. The joining at C is made air-tight by means of some substance applied to it called a lute. There are several methods made use of for supporting both retort and receiver, according to the degree of heat employed in the process. When great heat is required, earthen retorts are used, which are placed in or on the fire; but if a moderate degree of heat only be required, glass retorts are employed, which may be placed in a sand-bath, or suspended over a lamp, as will be shown hereafter in *fig.* 3. In this case, the receiver may be placed upon some stand convenient for the purpose, with a ring of hay under it to keep it steady.

Fig. 2 is a phial with a bent glass tube fitted into it for disengaging gas.

Fig. 3 represents an improved pneumatico-chemical apparatus, completely fitted up with a lamp furnace. A is a vessel filled with water, in which a shelf is placed so as to be two, three, or four inches under the surface, having holes bored through it, to which small funnels may be attached underneath. The glass receiver B, which is to contain the gas, is filled with water, and, being inverted with its mouth under water, it is raised gently and placed upon the shelf over one of the holes. The receiver will remain full of water by means of the pressure of the atmosphere. The materials from which the gas is to be disengaged are now to be put into the retort C, which is afterwards suspended in one of the rings of the lamp furnace D. A common Argand's lamp is placed on the shelf F, and adjusted to the proper height below

the retort, the neck of which rests upon the edge of the cistern, and the end of its neck opens in the funnel under the jar standing upon the shelf. The lamp thus adjusted may be lighted, and as soon as the substances in the retort act upon each other sufficiently, the gas will begin to be disengaged, and will ascend through the hole in the shelf into the receiver B, and displace the water with which it had been filled. When all the water is displaced, the receiver is full of gas which was disengaged from the retort, and may be preserved in it by keeping its mouth always under the water in the cistern. The receiver may, in this state, be removed to any other place by first sliding it carefully into a deep plate or dish previously filled with water, so that it be not once raised above the surface of the fluid; or the gas may be transferred from the vessel B into any other vessel in the following manner: Fill the vessel into which the gas is to be transferred with the water in the trough, and place it on the shelf as before directed, over one of the holes. Then take the receiver, and, keeping its mouth still under the fluid, bring it under the hole on which the vessel is placed, depressing its bottom, and elevating its mouth, so as to bring it more to a horizontal position: the gas, being the lighter body, will escape and rise up through the hole on which the other vessel has been placed, and will fill it by displacing the fluid. In this manner any gas may be formed, or transferred from one vessel to another.

Experiment.—Put some pure oxygenated muriate of potash into the retort C, and then apply the heat

of the lamp, the salt will melt, and the gas, which is oxygen gas, will be given out in abundance, and may be collected in the receiver B.

Oxygen gas may also be thus obtained from the red oxyde of mercury; from red lead, and from nitre.

When the gas to be procured is absorbable by water, quicksilver is used instead of water: but as this fluid is very expensive, a smaller vessel is necessary, and it may be made of wood or stone, as neither of these substances are acted upon by the mercury.

A small glass vessel, capable of containing an ounce measure, is used for measuring gases; for if it be successively filled, and inverted under a large jar, we may by this means throw into that jar any given or required quantity of an elastic fluid, or a certain number of measures of one elastic fluid, and any number of another, as we please.

G, in *fig.* 3, represents a tube for receiving a mixture of gases that are to be exploded by the electric spark. It is a strong glass tube closed at one end, having a scale upon it cut with a diamond. Near the closed end two wires pass through the glass, and almost touch one another: these are cemented in, so as to make the holes air-tight. When this graduated tube is filled with the fluid in the trough, and inverted upon the shelf, the gases to be exploded are introduced in the usual way. If now the interval between the two wires be made a part of the electrical circuit, by fastening chains connected with a Leyden phial to the rings of the

wires, the spark will pass through the interrupted space between the two wires, and explode the gases.

In compound distillations, or when a decomposition of the materials subjected to this process takes place, and gases are formed, some of which are absorbable, and others are not capable of being absorbed, it is often required to preserve separate the several new substances so procured. To do this the following apparatus was invented by M. Lavoisier, and soon came into general use.

A, *fig.* 4, is a glass tubulated retort, the neck of which is adjusted to the balloon or receiver X, which is double tubulated at B and C; by the *former* it admits the gas from the retort A, and by the latter it is conveyed into the liquor contained in the glass vessel GH. With this vessel, which has three tubulures, may be connected two or more similar vessels, by means of other glass tubes proceeding from *cz*, and fitted into their tubulures; and from the last tubulure of the range, is adapted a glass tube F, which is conveyed under a receiver placed upon the shelf of the pneumatic cistern, as B in *fig.* 3. Water is put into the first of these vessels, a solution of caustic potash in the second, and such other substances in the rest as are necessary for absorbing the gases that pass over. To prevent the danger that might occur from a reabsorption of the gas, which sometimes takes place, and would occasion the water from the pneumatic tub to enter rapidly into the vessels through the

tube F, a capillary tube, as H, is adapted to the middle tubulure of each receiving vessel, which goes into the liquid contained in it: so that if absorption takes place either in the retort or other vessels, the external air enters through these tubes to fill the vacuum which is occasioned by the absorption, and prevents the water coming into the vessel.

Having shown the apparatus necessary for obtaining the several kinds of gas, we may observe that in chemistry there are operations which require very different kinds of vessels: such for instance is *fusion*, or the melting of a solid body, as a metal, and causing it to pass from the solid to a liquid state by the action of heat. These substances require, according to their several natures, vessels of different kinds strong enough to resist the fire; they are made of earthenware, of porcelain, or a mixture of clay and powder of black-lead, or of black-lead altogether. These vessels are called *crucibles*, and are represented by *fig.* 5. Sometimes they have covers made of earthenware, but in other cases the fused metal must be exposed to a current of air; for this purpose the crucibles are broad and shallow. These, as at *fig.* 6, are called *cupels*, and they are generally made of calcined bones, mixed with a small quantity of clay, or of a mixture of clay and black-lead powder. As the cupels do not admit of being put in a close furnace, or of being surrounded by coals, they are placed under a sort of oven of earthenware, called a muffle,

one of which is represented in *fig.* 7, which, with the included cupel, is exposed to the heat of a furnace.

Blow-pipes are used for directing the flame of a candle or lamp against any piece of ore or other substance required to be examined. They ought to have a bulb upon the middle of their stem, in which the moisture from the breath may be collected. See *fig.* 8.

The various degrees of heat which are required for the performance of chemical operations, render it necessary that the chemist should be possessed of a furnace. A description of a very useful one is as follows: it consists of a cylindrical body of sheet iron, coated within with a mixture of loam and clay (*fig.* 9). The aperture A at the top is closed occasionally with an iron saucer full of sand, which forms a sand-bath. B is the door of the fire-place, and C is the ash-pit register which slides so as to admit more or less air. D is an iron tube which goes into the chimney of the room to carry off the smoke.

As a further illustration of the operative part of chemistry, we will suppose that an *unknown liquid* is offered for chemical examination; and that it is first required to obtain a knowledge of the *gaseous* matters which it will yield. In this case a portion of the fluid is put into the retort C (*fig.* 3), placed either over the naked burning coals, or the flame of a lamp, or in heated sand. The other end of the retort is immersed in water, or mercury, contained in the trough

A, under the receiver B. Heat being applied, and gaseous matter extricated, it rises in bubbles through the fluid, fills the, now, upper part of the receiver, and gradually assumes the place of the water. The gas, confined in the receiver, may then be submitted to any examination. If it is required to separate the fluid part from the substance in the retort, a receiver D is fixed on to the retort A, *fig.* 1, and heat being applied, the *distillation* of the aqueous part will take place, and may be preserved for future examination. Distillation is sometimes performed through a series of receivers, both for the sake of greater safety, and for a more certain and correct mode of obtaining the several products; but, in the more ordinary operations, the distillation is performed by a common *still* or *alembic*. The substance to be distilled being put into the vessel, generally made of copper, the *head of the alembic*, with a *crane-neck*, is closely fitted on and luted; and its *beak* is inverted into the *worm*, or *serpentine metallic tube*, which, passing through water, kept cold, condenses the heated vapour into a fluid, which is then collected, as it runs from the spout of the worm.

If the separation of the aqueous part be only wanted, then the matter remaining in the retort is placed in an open dish; and, by the continued action of heat, the liquid part will be dispersed by *evaporation*, leaving the solid remains. On fresh water being added to this, a *solution* will be obtained, which may be completely separated from the undissolved parts by *filtra-*

tion. Some particular substances being now added to the solution, which may form *insoluble salts*, with the earths or metals it may contain, these will fall to the bottom by *precipitation*, and will require farther examination. The earths, subjected to the action of fire, will become free from other substances by *calcination*; inflammable substances will leave their *ashes*, and, if burned without the access of air, their *charcoal* will remain; and the metals, if not refractory, will become *melted*. But to perform this latter process more readily, the substance should be put into a *crucible*, or *melting pot* (*fig.* 5), and then exposed to a due degree of heat, or subjected to the blow-pipe.

The operations of chemistry must necessarily be numerous, and their modifications must be frequently varied; but most others must be founded on those which we have here mentioned.

Chemistry, whether we view it as a science contributing to the extension of the knowledge of the other sciences, or as yielding perpetual aid and improvement to the arts, or as enabling us to catch a glance at the grand operations of nature, is of the highest interest and importance. Viewing its extensive influence, acting in concurrence with the powerful agencies of galvanism and electricity, it excites the perpetual hope that philosophy is just at the point of displaying some new and astonishing manifestation of the sublime power and wisdom of our GREAT CREATOR.

Let *every thing* you *see* represent to your spirit the presence, the excellency, and the power of GOD; and let your conversation with the *creatures* lead you unto the CREATOR; for so shall your actions be done more frequently with an actual eye to God's presence, by your often seeing him in the *glass of the creation*. In the face of the *sun* you may see God's beauty; in the *fire* you may feel his heat warming; in the *water* his gentleness to refresh you; and it is the *dew* of heaven that makes your field give you bread. This philosophy, which is obvious to every man's experience, is a good advantage to our piety, and by this act of the understanding our wills are checked from violence and misdemeanour.—*Taylor's Holy Living.*

What are my eyes, but aids to see
The glories of the DEITY
Inscribed with beams of light
On *flow'rs* and *stars*? LORD, I behold
The shining *azure*, *green* and *gold*;
But when I try to read THY name, a dimness veils my sight.
Watts's Horæ Lyricæ.

When he went abroad among the scenes of rural verdure, beauty, and fruitfulness, like the *bee* in its industrious ranges for celestial sweets, he was solicitous to gather fresh food for heavenly contemplation, or fresh materials and ornaments for future compositions. The pastures covered with *flocks* and *herds*, the fields waving with the ripening *harvests*, the groves resounding with the *melody of birds*, enlivened his praises, and he saw, heard, and confessed his GOD in all. The *skies* by day struck his soul with admiration of the immense power, wisdom, and goodness of their divine Author: the *moon* and *starry* train by night increased his conceptions of the Deity; and in the OPEN MANUSCRIPT OF GOD, the wide-extended heavens, he read the letters of his great and wonderful name with profound homage and veneration. All that met his eye or ear was laid, as it were, under a tribute to yield him improvement, and consecrate and enrich his moments of leisure and necessary cessation from his studies; and, in short, NATURE was only a scale to his devout soul, by which to ascend to the knowledge and adoration of GOD.—*Life of Dr. Watts.*

What though I trace each Herb and Flower
That drinks the morning dew,
Did I not own JEHOVAH's power,
How vain were all I knew!

Say what's the rest but empty boast,
The pedant's idle claim,
Who, having all the substance lost,
Attempts to grasp *a name?*

Oratorio of Solomon.

TIME'S TELESCOPE

FOR

1819.

JANUARY.

THE name given to this month by the Romans was taken from *Janus*, one of their divinities, to whom they gave two faces; because, on the one side, the first day of this month looked towards the new year, and on the other towards the old one. It was called *wolf-monat* by our Saxon ancestors, on account of the danger then experienced from wolves; 'for that, through the extremity of cold and snow, those ravenous creatures could not find of other beasts sufficient to feed upon.'

Remarkable Days

In JANUARY 1819.

1.—CIRCUMCISION.

THIS festival was instituted in the sixth century, in commemoration of the circumcision of our Saviour; a rite of the Jewish law, first enjoined to Abraham as a token of the covenant God made with him and his posterity. *New Year's Day* has ever been considered a season of joy and congratulation for blessings received and dangers escaped in the year past, as well as for gratitude to the kind Providence which permits us

to witness the commencement of a succeeding one.

The Romans, at this time, sent presents of sweetmeats, as dried figs, honey, &c. *(strenæ)*, expressing a wish that their friends might enjoy the *sweets* of the year into which they had entered. A relic of this custom is still observed in the south of Scotland, where the *sweetie-skon*, a sort of plum-cake, constitutes the New Year's Gift. Among the *northern nations*, it was customary for subjects to present gifts to their sovereigns, which were called *jolagiafir*, yule-gifts. In France, particularly in the south, early in the morning of New Year's Day, a round of visits is commenced to relations and friends, to wish them a happy new year, and to present them with *bonbons* (sweetmeats.)—See T. T. for 1815, p. 2.

The antient custom of going about with the *wassail*, 'a bowl of spiced ale,' is yet retained in many places. The composition was ale, nutmeg, sugar, toast, and roasted crabs or apples, and was called lamb's wool. Some verses still sung in Gloucestershire, on this day, may be seen in our volume for 1814, p. 3.

The 'New Year's Gift,' a relic of the most antient observances of the day, is yet general in our own country; and, however trifling the present, is at least a pleasing memorial of the friendship and good-will of the giver.

In 1765, Bishop Lyttleton shewed the Society of Antiquaries a large parchment roll, containing a list of New Year's Gifts presented to Queen Elizabeth at Greenwich, on the 1st of January, 1584-5, signed by the queen, and countersigned by John Astley, Esq. master and treasurer of the jewels; by which it appears, that the greatest part, if not all the peers and peeresses of the realm, all the bishops, the chief officers of state, and several of the queen's household ser-

vants, even down to her apothecaries, master-cook, sergeant of the pastry, &c. gave New Year's Gifts to her majesty, consisting either of a sum of money, or jewels, trinkets, wearing apparel, &c. Most of the peeresses gave rich gowns, petticoats, kirtles, doublets, mantles, some embroidered with pearls, garnets, &c. bracelets, caskets studded with precious stones, and other toys. The queen's physician presented her with a box of foreign sweetmeats; her apothecary with a box of lozenges, and a pot of conserves; her master-cook with 'a fayre marchepayne' (a macaroon then in fashion), her sergeant of the pastry, 'a fayre pye oringed,' &c. On the back of this roll was a list of the gifts presented by the queen in return, the whole of which consisted of gilt plate: 'To the Earl of Leicester one hundred and thirty-two ounces;' 'To the Earl of Warwick one hundred and six ounces,' &c. &c., the sum total being 4809 ounces.

In Paris, on this day, there is an exhibition of some of the finest specimens of china manufactured during the preceding year in the royal establishment at Sevres, which is open to the royal family only for a few days, and afterwards to the public. Sevres, being not far distant from Versailles, is often visited by English tourists in their way either to or from that celebrated palace; but, notwithstanding the munificent support of both royal and imperial patronage, we may be allowed to say, that the far-famed productions of this splendid manufactory, as well as of the Paris exhibition, are not such as would lead us to undervalue the equal, if not superior, china made by public-spirited individuals in this country.

The commencement of a New Year is a period for serious reflection; it becomes us to be thoughtful, as the lapse of time suggests topics of intellectual and moral improvement.

Ye gladsome bells—how misapplied your peal!
A day like *this* requires a solemn chime;
Infatuate mortals! why with sportive heel
Dance ye exulting o'er the grave of Time?

Is he your *foe* that thus you ring his knell,
That festive notes announce his awful flight?
Tire ye of day—that sounds of triumph tell
How swift the wing that wafts your last long night?

While circling years o'er thoughtless myriads roll,
Long folly, but to lend, and length of shame;
Ye metal tongues swing slow, with mournful toll,
Virtue's departed season to proclaim!

Sons of delay! whose duties, yet undone,
Await from year to year your hand in vain,
Drown—drown that brazen music with a groan!
The years ye *lost*—shall ne'er be *yours* again!

FAWCETT.

6.—EPIPHANY.

The rites of this day, the name of which signifies *an appearance of light*, or *a manifestation*, are different in various places, though the object of them is much the same in all; namely, to do honour to the memory of the Eastern magi, to whom Christ on this day was *manifested*, and who, according to a tradition of the Romish church, were three in number, and of royal dignity. This being the *Twelfth-day* after the Nativity of our Lord, is celebrated in the metropolis and in the south of England, by drawing lots, and assuming fictitious characters for the evening:—formerly the king or queen was chosen by a *bean* found in a piece of divided cake; and this was once a common Christmas gambol in both the English Universities. The day after Twelfth Day was called St. Distaff's Day. The customs on this day in Northumberland, France, and at Rome, are described at length in T. T. for 1815, p. 5. On the Epiphany, the king of England offers annually, by proxy, at the chapel royal, St. James's, gold, frankincense, and myrrh.

*6. 1786.—HALSEWELL EAST-INDIAMAN LOST.

This lamentable catastrophe took place at Seacombe, in the isle of Purbeck, on the coast of Dorsetshire. The vessel was commanded by Captain Pierce, a man of ability and character. Among the passengers were two of his own daughters, and five other ladies, equally distinguished by their personal charms and mental attainments. These, together with the venerable commander, most of his officers, and the passengers, were all buried in the remorseless deep; and so complete was the wreck, that not an atom of the ship was ever after discoverable.—(*Butler's Chronological Exercises.*)

Ocean! thou dreadful and tumultuous home
Of dangers, at eternal war with man:
Death's capitol, where most he domineers,
With all his chosen terrors frowning round. YOUNG.

*7. 1796.—PRINCESS CHARLOTTE OF WALES BORN.

That eye is dark—that gentle breast
Is loveless now, and chilled to rest;
That soul is dwelling now on high,
And shines a star that cannot die.

—

She was
A pattern to all princes living with her,
And all that shall succeed.

—

BRITANNIA! tear thy laurel leaf,
Entwine it frae thy bonny brow;
Filled is the measure o' thy grief,
Nae splendour will become thee now:
Bind on thy temples wreaths o' rue,
And mournful rest on CHARLOTTE's tomb;
And Windsor Palace wave with yew—
And *ceaseless* wail her early doom.

Blest wi' the Husband o' thy choice,
Sweet CHARLOTTE! happiness was thine;
Life then to thee was fu' o' joys,
A foretaste o' the bliss divine:

But, Fate, why bind the eglantine
Wi' the dark blossoms o' the grave?
Why, why the mournful wreath entwine,
And bid it over CHARLOTTE wave?

When lingering on the verge of death,
Intent ye gazed upon thy love;
Grasped his warm hands to cheer his faith,
And never bade thy fond eyes rove;
Mildly they beamed, an' never strove
To stray frae him, but gazed their fill,
And, when in death they ceased to move,
They pointed to the Husband still!

Blest in the flush o' nature's bloom,
A nation's pride, a nation's joy,
How soon to slumber in the tomb
An' ilka brightnin' hope destroy!
Resting wi' thee th' bonny Boy
Wha might hae wore the British Crown,
The Star o' Brunswick's set in woe,
An' a' the lovely prospects flown.

Britannia! tear thy laurel leaf,
Entwine it frae thy bonny brow;
Filled is the measure o' thy grief,
Nae splendour will become thee now;
Bind on thy temples wreaths o' rue,
And mournful rest on CHARLOTTE's tomb;
And Windsor Palace wave with yew—
And ceaseless wail her early doom[1].

8.—SAINT LUCIAN.

Lucian, a native of Syria, was celebrated in his youth for his eloquence, and intimate acquaintance with polite literature. After the death of his parents, he gave all his fortune to the poor, and confined himself to the study of the scriptures. He was a proficient in Hebrew, and revised the Septuagint version of the Bible. He wrote an apology for the Christians, and presented it to Maximinus II. After having undergone various

[1] See the '*Cypress Wreath*,' a collection of the best poems that have appeared on this melancholy occasion.

torments, at the instigation of this emperor, he was martyred in the year 312.

11.—PLOUGH MONDAY.

On this day, or about this time, in the north, the *fool-plough* goes about, a pageant that consists of a number of sword-dancers, dragging a plough, with music, and one, sometimes two, in a very fantastic dress; the *Bessy*, in the grotesque habit of an old woman, and the *fool*, almost covered with skins, wearing a hairy cap, and the tail of some animal hanging from his back. The office of one of these characters is, to rattle a box among the spectators of the dance, in which he collects their little donations.

The fool-plough, in Germany, is somewhat different. In Franconia, young women are yoked to the plough, upon which a piper sits and plays; and the ladies are then dragged into some river or pool.

13.—SAINT HILARY.

Hilary was born at Poictiers in France, of an illustrious family; and of this place he was chosen bishop in the year 353. Having taken an active part against the Arians, he was banished to Phrygia, by order of the Emperor Constantius, in 356, where he remained for three years. After various travels in different parts, and many sufferings, Hilary died at Poictiers in 368. He was an excellent orator and poet; his style abounds with rhetorical figures.

*13. 1818.—RT. HON. G. ROSE DIED, ÆT. 73.

A man whose whole life was active, laborious, and useful; and presented an instance of what may be accomplished by industry and integrity. He was up early and late, and, with a total disregard of amusement, was always and totally in his business. To his encouragement and exertions the country is, in a great measure, indebted for the excellent system of SAVINGS' BANKS, now so

generally adopted. He died M. P. for Christchurch, &c., and, though he rose from very small beginnings, was enabled to bequeath a large property.

*15. 1559.—QUEEN ELIZABETH CROWNED.

Her vigour, her constancy, her magnanimity, her penetration, vigilance, address, are allowed to merit the highest praises, and appear not to have been surpassed by any person that ever filled a throne: a conduct less rigorous, less imperious, more sincere, more indulgent to her people, would have been requisite to form a perfect character. By the force of her mind, she controlled all her more active and stronger qualities, and prevented them from running into excess: her heroism was exempt from temerity, her frugality from avarice, her friendship from partiality, her active temper from turbulency and a vain ambition: she guarded not herself with equal care or equal success from lesser infirmities; the rivalship of beauty, the desire of admiration, the jealousy of love, and the sallies of anger. Her singular talents for government were founded equally on her temper and on her capacity. Endowed with a great command over herself, she soon obtained an uncontrolled ascendant over her people; and while she merited all their esteem by her real virtues, she also engaged their affections by her pretended ones. Few sovereigns of England succeeded to the throne in more difficult circumstances; and none ever conducted the government with such uniform success and felicity. Though unacquainted with the practice of toleration, the true secret for managing religious factions, she preserved her people, by her superior prudence, from those confusions in which theological controversy had involved all the neighbouring nations: and though her enemies were the most powerful princes of Europe, the most

active, the most enterprising, the least scrupulous, she was able by her vigour to make deep impressions on their states: her own greatness, meanwhile, remained untouched and unimpaired.—(*Hume.*)

If ever royal virtues crowned a crown,
  If ever mildness shone in majesty,
If ever honour honoured renown,
  If ever courage dwelt with courtesy,
If ever princess put all princes down
  For temperance, prowess, prudence, equity,
This! this was she, that in despight of death
Lives still adored, admired ELIZABETH:
Spain's rod, Rome's ruin, Netherlands' relief,
Heaven's gem, earth's joy, world's wonder, Nature's chief.

WORTHIES OF DEVON, *fol.* 1701, *p.* 332.

18.—SAINT PRISCA.

Prisca, a Roman lady, was early converted to Christianity; but refusing to abjure her religion, and to offer sacrifice when she was commanded, was horribly tortured, and afterwards beheaded, under the Emperor Claudius, in the year 275.

O could we step into the grave,
  And lift the coffin lid,
And look upon the greedy worms
  That eat away the dead;
It well might change the reddest cheek
  Into a lily white;
And freeze the warmest blood to look
  Upon so sad a sight!
Yet still it were a sadder sight,
  If in that lump of clay
There were a sense to feel the worms
  So busy with their prey.
O pity then the living heart;—
  The lump of living clay,
On whom the canker-worms of care
  For ever, ever, prey!

20.—SAINT FABIAN.

St. Fabian succeeded St. Anterus in the pontificate, in the year 236. Eusebius relates, that, in

an assembly of the people and clergy, held for the election of a pastor in his room, a dove, to the great surprise of all present, settled on the head of St. Fabian; and that this miraculous sign united the votes of the clergy and people in promoting him, though a layman and a stranger. He governed the church sixteen years, sent St. Dionysius and other preachers into Gaul, and condemned Privatus, the promoter of a new heresy in Africa, as appears from St. Cyprian. St. Fabian died a glorious martyr in the persecution of Decius in 250, as St. Cyprian and St. Jerom bear witness. The former, writing to his successor, St. Cornelius, calls him an *incomparable man;* and says, that the glory of his death was equal to the purity and holiness of his life.

21.—SAINT AGNES.

St. Jerom says, that the tongues and pens of all nations are employed in the praises of this saint, who overcame both the cruelty of the tyrant and the tenderness of her age, and crowned the glory of chastity with that of martyrdom. St. Austin observes, that her name signifies *chaste* in Greek, and a *lamb* in Latin. She has been always considered by the Catholics as a special patroness of purity, with the immaculate Mother of God and St. Thecla. Rome was the theatre of the triumph of St. Agnes; and Prudentius says, that her tomb was shown within sight of that city. She suffered not long after the beginning of the persecution of Dioclesian, whose bloody edicts appeared in March in the year of our Lord 303. She was only thirteen years of age at the time of her glorious death.

On the eve of St. Agnes's-day, many kinds of divination are practised by the rustic damsels in the north, to discover their future husbands.—See T. T. for 1815, p. 9, where are some further particulars of this saint.

22.—SAINT VINCENT.

Vincent, a deacon of the church in Spain, suffered martyrdom in the Dioclesian persecution, about the year 303. A full description of the dreadful cruelties which he bore may be seen in T. T. for 1815, p, 12.

25.—CONVERSION OF SAINT PAUL.

Saint Paul suffered martyrdom under the general persecution of Nero. Being a Roman citizen, he could not be crucified by the Roman laws, as his colleague St. Peter was; he was, therefore, beheaded:—hence the usual representation of him with a sword in his hand. St. Chrysostom tells us that his picture was preserved by some of the christians in his time, and that he was but of a low stature (three cubits), that is, four feet six inches high. Nicephorus describes him as a small man, somewhat crooked, of a pale complexion, and appearing older than he really was.

Lord Lyttleton's 'Observations on the Conversion of St. Paul' deserve the most careful perusal of every scholar and every christian.

*28. 1725.—PETER THE GREAT DIED, ÆT. 52.

A people savage from remotest time,
A huge neglected empire, ONE VAST MIND,
By Heaven inspired, from Gothic darkness called.
Immortal PETER! first of monarchs! he
His stubborn country tamed, her rocks, her fens,
Her floods, her seas, her ill-submitting sons;
And while the fierce barbarian he subdued,
To more exalted soul he raised the man.
Ye shades of antient heroes, ye who toiled
Through long successive ages to build up
A labouring plan of state, behold at once
The wonder done! behold the matchless prince!
Who left his native home, where reigned till then
A mighty shadow of unreal power;
Who greatly spurned the slothful pomp of courts;
And, roaming every land, in every port
His sceptre laid aside, with glorious hand,
Unwearied plying the mechanic tool;
Gathered the seeds of trade, of useful arts,
Of civil wisdom, and of martial skill. THOMSON.

*29. 1739.—WESTMINSTER BRIDGE.

The first stone was laid on this day: the masonry used in its erection was nearly double the quantity employed in building St. Paul's Cathedral!

30.—KING CHARLES I, MARTYR.

He was the worthiest gentleman, the best master, the best friend, the best husband, the best father, and the best christian, that the age in which he lived produced. (*Clarendon.*) An elegant and candid tribute is paid to the memory of King Charles in the sermon of Bishop Horne, entitled *The Christian King.*

One of the Lansdowne MSS. now deposited in the British Museum (lately copied into the Morning Advertiser) records the following singular affair respecting the unfortunate Charles I and the accomplished Lord Falkland, who was slain in a skirmish in which he unnecessarily engaged, the day before the first battle of Newbury:—

'About this time, there befel the king an accident, which, though a trifle in itself, and that no weight is to be laid upon any thing of that nature; yet since the best authors, both ancient and modern, have not thought it below the majesty of history to mention the like, it may be the more excusable to take notice of.

'The king being at Oxford during the civil wars, went one day to see the public library, where he was shewn, among other books, a *Virgil,* nobly printed and exquisitely bound. The Lord Falkland, to divert the king, would have his majesty make a trial of his fortune by the *sortes virgilianæ,* which every body knows was an unusual kind of augury some ages past. Whereupon the king opening the book, the period which happened to come up was that part of *Dido*'s imprecation against *Æneas,* which Mr. Dryden translates thus:—

Yet let a race untamed, and haughty foes,
His peaceful entrance with dire arms oppose;
Oppressed with numbers in th' unequal field,
His men discouraged and himself expelled,
Let him for succour sue from place to place,
Torne from his subjects and his sons embrace,
First let him see his friends in battle slain,
And their untimely fate lament in vain;
And when at length the cruel war shall cease,
On hard conditions may he buy his peace.
Nor let him then enjoy supreme command,
But fall untimely by some hostile hand,
And lie unburied on the barren sand.

ÆNEID, *b.* iv, *l.* 88.

'It is said, King Charles seemed concerned at this accident, and that the Lord Falkland observing it, would likewise try his own fortune in the same manner, hoping he might fall upon some passage that could have no relation to his case, and thereby divert the king's thoughts from any impression the other might have upon him. But the place that Falkland stumbled upon was yet more suited to his destiny than the other had been to the king's; being the following expressions of *Evander* upon the untimely death of his son *Pallas*, as they are translated by the same hand:—

O Pallas! thou hast failed thy plighted word
To fight with caution, not to tempt the sword:
I warned thee, but in vain; for well I knew
What perils youthful ardour would pursue.
That boiling blood would carry thee too far;
Young as thou wert in dangers—raw in war!
O curst essay in arms,—disastrous doom,—
Prelude of bloody fields and fights to come.

ÆNEID, *b.* XI, *l.* 230.

For an account of the character and manners of King Charles, we refer to T. T. for 1815, p. 16; some particulars of his trial will be found in p. 18 of the same volume, and in T. T. for 1816, p. 6. See also T. T. for 1814, p. 8, for a descrip-

tion of the finding of his body in St. George's Chapel, Windsor.

*30. 1817.—DUKE OF MARLBOROUGH DIED.

The first duke was called, and deservedly retains, the title of "the *great* Duke of Marlborough:" the late duke (the third) will, undoubtedly, for many years, be distinguished by the yet prouder appellation of "the *good* Duke of Marlborough." He died at Blenheim, aged 78; and only the day previous to his dissolution, took his usual exercise in his carriage.

Astronomical Occurrences

In JANUARY 1819.

Obliquity of the Ecliptic.

THE explanations we have already given in our previous volumes will be fully sufficient for enabling our readers to comprehend what is meant by the obliquity of the ecliptic and its variations; and, consequently, to understand the following table on this subject.

TABLE.

January	1st, the obliquity is - -	23°	27′	57″·3
April - - -	1st, - - - - - - - - -	23	27	58 ·3
July - - - -	1st, - - - - - - - - -	23	27	57 ·6
October - -	1st, - - - - - - - - -	23	27	58 ·6
December	31st, - - - - - - - - -	23	27	57 ·8

The equation of the equinoctial points for the same periods of this year is also as follows: viz.

January - -	1st, the equation is - - - -	7ˢ·9
April - - -	1st, - - - - - - - - - -	6 ·5
July - - - -	1st, - - - - - - - - - -	5 ·1
October - -	1st, - - - - - - - - - -	3 ·6
December -	31st, - - - - - - - - - -	2 ·0

The Sun enters Aquarius at 41 m. after 7 on the evening of the 20th of this month. The following table also shows the time of his rising

and setting on every fifth day during the same period. The time for any intermediate day must be found by proportion, as already explained.

TABLE

Of the Sun's Rising and Setting for every fifth Day.

January 1,	Sun rises	5	m.	after	8.	Sets	55	m.	after	3
6,	- - -	1	- -		8	-	59	- -	-	3
11,	- - -	57	- -		7	-	3	- -	-	4
16,	- - -	51	- -		7	-	9	- -	-	4
21,	- - -	45	- -		7	-	15	- -	-	4
26,	- - -	38	- -		7	-	22	- -	-	4
31,	- - -	30	- -		7	-	30	- -	-	4

Equation of Time.

The following table shows what must be added to apparent time, or that as shown by a good sundial, to obtain mean time for every fifth day of the present month. The correction for any intermediate day must be found by proportion, as already directed.

TABLE.

			m.	s.
Friday - - -	1st,	to the time on the *dial add*	3	42
Wednesday	6th,	- - - - - - - - - - -	6	0
Monday - -	11th,	- - - - - - - - - - -	8	7
Saturday - -	16th,	- - - - - - - - - - -	9	39
Thursday - -	21st,	- - - - - - - - - - -	11	34
Tuesday - -	26th,	- - - - - - - - - - -	12	50
Sunday - - -	31st,	- - - - - - - - - - -	13	46

Phases of the Moon.

First Quarter	8d,	at	40	m.	after	8	morning.
Full Moon -	11th,	-	56	- -	-	11	- - -
Last Quarter	19th,	-	43	- -	-	9	- - -
New Moon -	26th,	-	10	- -	-	1	- - -

Moon's Passage over the Meridian.

The Moon's centre will pass the first meridian of this country, or that on which the Royal Observatory is situated, at the following times during the present month; and which will therefore af-

ford convenient times of observation to such as are not very distant from that meridian. The time of her passing any other meridian, or of her being exactly south of any observer, must be found by means of his longitude and her horary motion.

TABLE

Of the Moon's Meridional Passage.

January	2d,	at	27	m.	after	5	in	the	evening.			
	3d,	-	10	-	-	-	6	-	-	-	-	-
	4th,	-	53	-	-	-	6	-	-	-	-	-
	5th,	-	36	-	-	-	7	-	-	-	-	-
	6th,	-	21	-	-	-	8	-	-	-	-	-
	7th,	-	8	-	-	-	9	-	-	-	-	-
	8th,	-	58	-	-	-	9	-	-	-	-	-
	9th,	-	48	-	-	-	10	-	-	-	-	-
	19th,	-	36	-	-	-	5	in	the	morning.		
	20th,	-	23	-	-	-	6	-	-	-	-	-
	21st,	-	16	-	-	-	7	-	-	-	-	-
	22d,	-	14	-	-	-	8	-	-	-	-	-

Phases of Venus.

Our astronomical readers are already aware that the phases of this beautiful planet vary like those of the Moon, but are subject to a much longer period in their entire revolution. It is our intention, therefore, to insert the appearance of Venus in this respect, on the first of every month, as calculated from the rule given in the following pages, which will enable our readers to ascertain these phases at any intermediate periods at pleasure; and it deserves to be remarked, that such computations afford excellent exercises for our youthful studies.

January 1st, disc of Venus { Enlightened part 0·15144 digits. / Dark part - - - 11·84856 - - -

Venus is therefore near the point of her inferior conjunction; and by comparing her appearance this month with that stated under the Occurrences in February, it will be seen that the illuminated

part of her disc is increasing, and that she has consequently passed her inferior conjunction.

Eclipses of Jupiter's Satellites.

None of the eclipses of Jupiter's satellites are visible this month, on account of his nearness to the Sun.

Form of Saturn's Ring.

As the plane of Saturn's ring is sometimes in the plane of the Earth's orbit, and at others considerably inclined to that orbit, it appears more elliptical or open at one time than another. The change in this elliptical appearance, however, is very slow, and we have therefore only inserted it for every third month. The method of calculation is explained under the head of next month.

January 1.	Conjugate axis - - - - -	0·058.
	Transverse axis - - - - -	1·000.

The ring will therefore appear at this time as a straight line.

Other Phenomena.

Mercury will be in his inferior conjunction at 45 m. after midnight on the 7th of this month, he will be stationary on the 19th, and attain his greatest elongation on the 31st. Venus will be stationary on the 16th. Jupiter will be in his inferior conjunction at half past 5 in the evening of the 15th. The Moon will be in conjunction with the star β in Taurus at 12 m. after 11 at night on the 8th; and with the star marked α in Scorpio, at 29 m. past 4 in the morning of the 22d.

On the PHASES *of* MERCURY *and* VENUS.

We have, in the former volumes of Time's Telescope, already explained the appearances of the inferior planets; and such of our readers as have attended to these explanations, will not be at any loss to comprehend the subsequent remarks relative to the phases of Mercury and

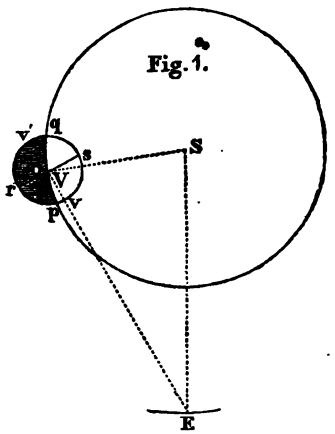
Venus. When these planets are examined with a good telescope, after their inferior conjunctions with the Sun (see T. T. for 1815, p. 22), they appear like the new Moon, shining with a fine luminous crescent. As their elongation from the Sun increases, this crescent augments in breadth; and when they reach their point of greatest western elongation, nearly half of their illuminated disc becomes visible. During their return to the Sun, the enlightened part of their disc is gradually turned towards the Earth, till their luminous side is opposite the Earth at the time of their superior conjunction; when they would appear like the full Moon, if they were not at that time rendered invisible by the intensity of the solar light. As they proceed from this point to their greatest eastern elongation, the enlightened part of their disc gradually diminishes till they become apparently about half illuminated, when they attain that elongation. In their return to the Sun, the enlightened part now continues to diminish, as the dark side of the planet is turned towards the Earth, which is completely the case, at the moment of their inferior conjunctions.

From these remarks, it is evident that the phases of the inferior planets are subject to constant variation like those of the Moon; and the following method will enable the reader to calculate these phases, or to find the greatest breadth of the enlightened part, at any time; the whole diameter of the disc being supposed to be divided into twelve equal parts or digits.

In order to accomplish this, let S, E, and V, in the following Figure, be the respective positions of the Sun, the Earth, and Venus, at any given time; then that side of Venus which is turned towards the Sun will be completely illuminated by his rays; but only a part of that enlightened face can

evidently be seen from the Earth. Draw E*v*V*v'* from the Earth through the centre of Venus, and join VS and ES; and draw *rs* perpendicular to EC and *po* perpendicular to *rs*; then *pq* will be the circle of illumination. Now as *p*V, a part of that circle, will be seen obliquely, it will, according to the laws of vision, and the immense distance of the planet compared with its magnitude, be projected into an elliptic arc on the plane of projection *rs*, and the point *p* will, to a spectator at E, appear at *o*; so that *ro* will be the versed sine of the arc *rp*, and consequently *so* the versed sine of the arc *sp*.

Fig. 1.



Now the angle *p*V*s* is equal the angle *v'*VS; for *p*V*v* is equal *v'*V*q*, and *v*V*s* equal to *q*VS, being both right angles; and therefore, by addition, the sum of the two angles *p*V*v*, *v*V*s*, is equal to the sum of the two *v'*V*q*, *q*VS; but *p*V*v* + *v*V*s* = *p*V*s*, and *v'*V*q* + *q*VS = *v'*VS; and consequently *os*, which is the versed sine of the former *p*V*s*, is also the versed sine of the latter *v'*VS. As this proof is not limited by any particular position of Venus, it follows as a necessary consequence,

that the breadth of the illuminated part of the planet's disc, as seen from the Earth, is always the versed sine of the exterior angle $v'VS$ of the triangle SEV formed by the lines supposed to join the centres of these three bodies. But the exterior angle $v'VS$ is equal to the sum of the two interior angles VSE and VES: and hence we have this easy rule for finding the breadth of the enlightened part of the disc of either Venus or Mercury, as seen from the Earth.

Add together the angles formed at the Sun and the Earth by the three lines supposed to join these two bodies to each other, and to the planet, and multiply the natural versed sine of this sum by 6, and the result will be the breadth of the illuminated part of the planet's apparent disc, in digits, or 12th parts of its diameter.

It may be necessary to observe, for the information of such of our readers who have not made much progress in the study of astronomy, that the angle at the Sun is equal to the difference of the heliocentric longitudes of the Earth and the planet; and that at the Earth is the difference of the geocentric longitudes of the Sun and the planet. These are to be found in the Nautical Almanac for the time required. The longitude of the Earth is found by adding 6 signs to the longitude of the Sun, as given in the Nautical Almanac, when that longitude is *less* than 6 signs, and subtracting them when it is *greater* than that quantity: thus, if l denote the longitude of the Sun, and l' that of the Earth, we shall have $l' = l + 6^s.$, as l is less or greater than 6 signs. If the longitude of the Sun, therefore, was $2^s.\ 12^\circ\ 42'$, that of the Earth will be $8^s.\ 12^\circ\ 42'$; and if that of the Sun was $9^s.\ 3^\circ\ 7'$, the longitude of the Earth would be $3^s.\ 3^\circ\ 7'$. It may also be observed, that when the arc of which the versed sine is required is greater than 90°, which is the

case when that angle exceeds 3 signs, this versed sine is found by subtracting the versed sine of its supplement from 2. To find the versed sine of $4^s.\ 15^\circ\ 20'$, we have $6^s. - (4^s.\ 15^\circ\ 20') = 1^s.\ 14^\circ\ 40'$, or $44^\circ\ 40'$, the versed sine of which is ·28879; and therefore, 2—·28879 = 1·71121 = the versed sine of $4^s.\ 15^\circ\ 20'$ or $135^\circ\ 20'$, as required.

Let it be required to ascertain the illuminated part of Venus on the 1st of January 1819. Then the heliocentric longitude of Venus, taken from the Nautical Almanac for that day, is $3^s.\ 13^\circ\ 50'$, and the longitude of the Sun $9^s.\ 10^\circ\ 19'$, consequently that of the Earth is $3^s.\ 10^\circ\ 19$; the geocentric longitude of Venus at the same time, also, is $9^s.\ 0^\circ\ 56'$; therefore,

Heliocentric longitude of Venus		$3^s.$	13° $50'$
Longitude of the Earth	*subtract*	3	10 19
Angle at the Sun		0	3 31
Longitude of the Sun		$9^s.$	10° $19'$
Geocentric longitude of the planet	*subtract*	9	0 56
Angle at the Earth		0	9 23
Angle at the Sun	*add*	0	3 31
Exterior angle at Venus	Sum	0	12 54

Hence the natural versed sine of $12^\circ\ 54'$, multiplied by 6, = ·02524 × 6 = 0^d·15144, the breadth of the enlightened part as stated above, under the head of Occurrences.

Again, for the 1st of July 1819, we have

The heliocentric longitude of Venus		$1^s.$	3° $28'$
The longitude of the Earth		9	8 45
Angle at the Sun	*difference*	3	24 43
The longitude of the Sun		3	8 45
Geocentric longitude of Venus		2	12 16
Angle at the Earth	*difference*	0	26 29
Angle at the Sun		3	24 43
	Sum	$4^s.$	21° $12'$

Now 180°—141° 12′ = 38° 48′, or 141° 12′, the versed sine of which is ·220662; and this taken from 2 leaves 1·779338, for the versed sine of 141° 12′; and which multiplied by 6, gives 10·67603 digits for the enlightened part of the disc of Venus at the time required.

The appearance of Venus, however, will be rendered more palpable by the following delineations. Let ABDE, Figs. 2 and 3, be the projected hemisphere, or disc of Venus, and EF the breadth of the enlightened part as found by the preceding method, as that is less or greater than the radius of the circle ABDE.

Fig. 2.

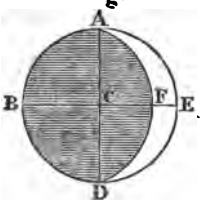
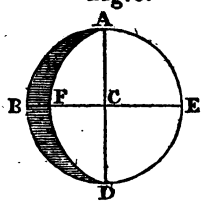


Fig. 3.



Then having described the circle, and drawn the diameters AD and BE at right angles to each other, set off EF, and describe semi-ellipses through the three points A, E, and D, having AD for their transverse, and CE for their semi-conjugate diameters, and they will be correct representations of Venus at these two stages of her illumination.

Now, if it were required to find the ratio between the dark and enlightened part of the planet's apparent disc, since, from the nature of the ellipse and circle, there is always a constant ratio between CF and CE or CB; and as the semi-ellipse and the semicircle may be conceived to be made up of an indefinite number of these lines, or rather small rectangles, the sum will have the same ratio as each pair; and consequently the ellipse and circle are also in the same proportion to each

other; whence the ratio between the dark and enlightened parts becomes known.

But as the diameter of the planet is supposed to be divided into 12 digits, and the breadth of the enlightened part is generally expressed in the same divisions, the ratio between these areas may readily be expressed in numbers. For by finding the area of the semi-ellipse of which both the transverse AD and the semiconjugate axis CF are given, and either subtracting it from the area of the semicircle, or adding it to that area, as EF is less or greater than EC, and the result will be the area of the enlightened part, expressed in square digits: and this area subtracted from that of the whole circle will give the area of the dark part of the disc in the same terms; and consequently the ratio between them is not only known, but also expressed in the most familiar terms.

The same reasoning applies equally to Mercury as to Venus; but as the former planet is so near the Sun as to present few opportunities for observation, on account of the intensity of the solar light, the calculation is seldom applied to him, and we have therefore not included the appearances of this planet under the head of Astronomical Occurrences.

[To be continued.]

The Naturalist's Diary.

For JANUARY 1819.

Now Cæcias sends
His cutting winds, his storms of hail, and snow,
Or binds the pregnant earth in icy chains;
The frost-nipt laurel, and the blighted bay,
Which lately shone in all the pride of health,
Stand withered monuments of his dire reign.

THE most intense cold in England is usually felt in the month of January, and the weather is

either bright with frost or foggy with much *snow*[1]. The inclemency of the season now compels the numerous tribes of birds to quit their retreats in search of food. The red-breast *(sylvia rubecula)* begins to sing. The robin has been frequently celebrated for his social disposition in entering the habitations of man; the following lines give a pleasing picture of him in the garden:

> Attendant on my garden's winter cares,
> When robin red-breast sees me with my spade
> About to turn the earth, to dig the roots
> Of celery or of endive, winter's salad,
> He comes, and settles almost at my foot;
> And, as I turn the earth-worm to his sight,
> He picks it out, retreats a step or two,
> And, having swallowed it, he comes again
> And asks another; and, when twilight's shades
> Have driven other birds to seek their roost,
> Before my study window on some spray,
> Or on the pointed summit of yon roof,
> He chaunts his even song, and then retires.
>
> J. PLUMPTRE[2].

This is the season when the *ice-houses* of gentlemen in the country, and the cellars of confectioners in London, are filled with ice. Some account of the construction of an ice-house may be acceptable to our readers. The *situation* of an ice-house ought to be towards the south-east, on account of the advantage of the morning sun in expelling the damp air, which is far more prejudicial to it than warmth. The best soil on which such a house can be erected, is a chalk-hill, or declivity, as it will take away the waste water, without the aid of any artificial drain; but where such land cannot be procured, a loose stony

[1] Of this phenomenon, and its important services to vegetation, we have already spoken at large in our former volumes.

[2] For some interesting particulars of the robin, consult our last volume, p. 21.

earth, or gravelly soil on a descent, is preferable to any other.

For the *construction* of an ice-house, a spot should be selected at a convenient distance from the dwelling-house. A cavity is then to be dug in the form of an inverted cone, the bottom being concave, so as to form a reservoir for the reception of waste water. Should the soil render it necessary to construct a drain, it will be advisable to extend it to a considerable length, or, at least, so far as to open at the side of the hill or declivity, or into a well. An air-trap should likewise be formed in the drain, by sinking the latter so much lower in that opening as it is high, and by fixing a partition from the top, for the depth of an inch or two into the water of the drain, by which means the air will be completely excluded from the well. A sufficient number of brick piers must now be formed in the sides of the ice-house, for the support of a cart-wheel, which should be laid with its convex side upwards, for the purpose of receiving the ice; and which ought to be covered with hurdles and straw, to afford a drain for the melted ice.

The sides and dome of the cone should be about nine inches thick, the former being constructed of *steened brick-work*, that is, without mortar, and with the bricks placed at right angles to the face of the work. The vacant space behind ought to be filled up with gravel, or loose stones, in order that the water oozing through the sides may the more easily be conducted into the well. The doors of the ice-house should likewise be so formed as to shut closely; and bundles of straw ought always to be placed before the inner door, for the more effectual exclusion of air.

The ice to be deposited in this building should be collected during the frost, broken into small pieces, and properly rammed down, in strata of

about one foot thick, so that it may become one complete body. In those seasons when sufficient quantities of ice cannot be procured, *snow* may be substituted, and preserved in a similar manner[1].

The fields are now clothed in their winter livery, and present a novel and agreeable spectacle to the eye. Some pretty lines on two greyhounds playing in the snow form an interesting description of the scenery of the month of January.

Level no more! The jetty pair,
The lightest things of earth or air,
My playful pets, are bounding there.
Oh! how on that white plain we trace
Each coal-black greyhound's form of grace;
Now wantoning in speed and strength;
Now stretching out their lazy length;
Now the wide-circling race renewing;
Now in close narrowing round pursuing;
Now bounding over bush and briar
With aimless glee—now leaping higher,
Hoping and half-succeeding oft
To catch the birds that soar aloft;
Now bending the long neck, the head
Deep-plunging in the glittering bed;
Then with quick jerk withdrawn, to throw
On all around the flaky snow;
Now leaning o'er the brook, with eye
That longs across its breast to fly,
And paw that pats the freezing rill
To try if it be water still;
Then rushing to their mistress' feet,
With fond caress her smile to meet.

About the beginning of the month, larks *(alauda arvensis)* congregate, and fly to the warm stubble for shelter; and the nut-hatch *(sitta europæa)* is heard. The shell-less snail or slug *(limax)* makes its appearance, and commences its depredations

[1] For some observations on the use of ice and snow in cooling liquors, we refer to our last volume, p. 211.

on garden plants and green wheat. The missel thrush *(turdus viscivorus)* begins its song. The hedge-sparrow *(sylvia modularis)* and the thrush *(turdus musicus)* begin to sing. The wren, also, 'pipes her perennial lay,' even among the flakes of snow. The titmouse *(parus)* pulls straw out of the thatch, in search of insects; linnets *(fringilla linota)* congregate; and rooks *(corvus frugilegus)* resort to their nest trees. Pullets begin to lay; young lambs are dropped now.

The house sparrow *(fringilla domestica)* chirps; the bat *(vespertilio)* appears; spiders shoot out their webs; and the blackbird *(turdus merula)* whistles. The fieldfares, red-wings, skylarks, and titlarks, resort to watered meadows for food, and are, in part, supported by the gnats which are on the snow, near the water. The tops of tender turnips and ivy-berries afford food for the graminivorous birds, as the ringdove, &c. Earthworms lie out on the ground, and the shell-snail *(helix nemoralis)* appears. See some lines to the snail in our last volume, p. 23.

Mr. Gisborne, in his 'Walks in a Forest,' draws a lively picture of cattle going to their accustomed pools to drink, when completely frozen over, and of their awkward attempts to obtain the grateful beverage.

> Sunk in the vale, whose concave depth receives
> The waters draining from these shelvy banks
> When the shower beats, yon pool with pallid gleam
> Betrays its icy covering. From the glade
> Issuing in pensive file, and moving slow,
> The cattle, all unwitting of the change,
> To quench their customary thirst advance.
> With wondering stare and fruitless search they trace
> The solid margin: now bend low the head
> In act to drink; now with fastidious nose
> Snuffing the marble floor, and breathing loud,
> From the cold touch withdraw. Awhile they stand
> In disappointment mute; with ponderous feet
> Then bruise the surface: to each stroke the woods
> Reply; forth gushes the imprisoned wave.

In this month, the flowers of the rosemary *(rosmarinus officinalis)* begin to open; the winter aconite *(helleborus hiemalis)*, and the bear's foot *(h. fœtidus)*, are in flower about the middle of the month; the mezereon *(daphne m.)* 'breathes mild its early sweets;' and the red dead-nettle *(lamium purpureum)* flowers under the shelter of southern hedges. The snowdrop[1] *(galanthus nivalis)* seems on the point of blowing. The common creeping crowfoot *(ranunculus repens)* is now in flower; and the crocus, if the weather be mild, appears above ground. Ivy casts its leaves; the catkin, or male blossom of the hazel *(corylus avellana)*, unfolds; the flowers of the holly *(ilex aquifolium)* begin to open; and the leaves of the honeysuckle *(lonicera periclymenum)* are quite out. Towards the end of January, the daisy *(bellis perennis)* is in full bloom.

The china rose *(rosa chinensis* and *rosa semperflorens)*, till lately unknown to us, and at first considered only as a greenhouse plant, is now seen in blow in the open air, even in the month of December, often with its red buds mossed with frost. The wallflower *(cheiranthus)*, periwinkle *(vinca, major & minor)*, and heart's-ease *(viola tricolor)*, are still in blow.

The golden saxifrage, called also golden *moss*, and stonecrop *(chrysoplenium)*, in the absence of other flowers, affords its little aid to give life and beauty to the garden. The bramble *(rubus fruticosus)* still retains its leaves, and gives a thin scattering of green in the otherwise leafless hedges; while the berries of the hawthorn, the wild rose, and the spindle-tree, afford their brilliant touches of red. The twigs of the red dogwood, too, give a richness amid the general brown of the other shrubs.

[1] For various poetical tributes to the snowdrop, see our five former volumes, in the Naturalist's Diary for Jan. and Feb.

Hunting and shooting are among the favourite amusements of this season. Skating, also, is much practised by young persons.

In this month, the farmer carries out manure to his fields, and repairs quickset hedges; taking advantage of the dry and hard ground, during frost. The barn resounds with the flail, barley being now threshed for malting. He lops forest trees, and cuts timber for winter use. About the end of the month, in dry weather, peas and beans are sown, and vetches for seed or fodder. Hogs are killed for bacon, and beef and hams are smoked.

When as the Old Yeere's date doth end,
For good New Yeere all wish and crave;
And New Yeeres gyftes abrode they send
To faythful friendes they hope to have.

DESCRIPTION OF FRUIT TREES[1].

Then let the learned Gardener mark with care
The kinds of stocks, and what those kinds will bear;
Explore the nature of each several tree,
And, known, improve with artful industry;
And let no spot of idle earth be found,
But cultivate the genius of the ground.

DRYDEN'S VIRGIL. GEOR. *b.* 2.

APPLE *(Pyrus malus)*. The common apple-tree, in its wild state, is armed with thorns. It forms, when cultivated alone, a spreading tree, the branches and twigs of which are distinguished from those of the pear-tree, which is of the same genus, by being more horizontal, irregular, and twisting; thus most accurately described by Virgil:—

Apple trees, whose trunks are strong to bear
Their *spreading* boughs, extend themselves in air;

[1] For a description of *Forest Trees*, with poetical illustrations, on the same plan as the present account of Fruit Trees, we refer to Time's Telescope for the year 1816, at the end of the Naturalist's Diary for each month. Some fruit *shrubs* are necessarily included in this account of *trees*.

Want no supply, but stand secure alone,
Not trusting foreign forces but their own;
Till with the ruddy fruit their bending branches groan!

The flowers are tinged with red, and have an exceedingly sweet smell. The leaves are yellowish above and whitish underneath. The wood of this tree is tolerably hard, especially in its wild state: it is turned into cogs for wheels, and acquires a very durable polish. The bark yields a yellow dye. Pomatum receives its name from the lard of which it is principally made, being beaten up with the pulp of apples. This inestimable fruit is as abundant in our climate as the orange is in those of Portugal, Spain, and Italy, where our apples are frequently called *English oranges*, because the apples of those countries bear no comparison with them either for richness of flavour or abundance of juice, and will never keep for any considerable time. It is not known how we have obtained the amazing number of different kinds of this fruit, now cultivated in Great Britain; they are classed separately into four principal divisions:—1. Early or summer apples; 2. Provincial apples, or those peculiar to certain places; 3. Winter or keeping apples; 4. Cyder apples.

It has been often lamented of late years, that too little attention is now paid to the cultivation of fruit trees in general; and especially that our apple-trees have latterly been suffered to degenerate and decay throughout the land. Many of those delicious kinds with which our forefathers used to regale themselves, are wholly extinct: but as the evil has been noticed by those who are best qualified to point out the remedy, there is good ground to presume that we shall soon see the remedy applied. At the same time, however, let the private cultivators each look well to his own orchard, and he will reap an ample reward in the improved quality, as well as

quantity, of his produce. Philips, in his poem entitled 'Cyder,' thus elegantly enumerates the most esteemed apples:—

The *Pippin* burnished o'er with gold; the *Moile*
Of sweetest honied taste: the fair *Permain*,
Tempered, like comeliest nymph, with red and white;
Salopian acres flourish with a growth
Peculiar, styled the *Ottley*: be thou first
This apple to transplant; if to the name
Its merit answer, nowhere shalt thou find
A wine more prized, or laudable of taste.
Nor does the *Eliot* least deserve thy care,
Nor *John-Apple*, whose withered rind, entrenched
With many a furrow, aptly represents
Decrepit age; nor that from *Harvey* named,
Quick relishing: why should we sing the *Thrift*,
Codling or *Pomroy*, or of pimple coat
The *Russet*, or the *Cat's-head*'s weighty orb,
Enormous in its growth.——
But how with equal numbers shall we match
The *Musk*'s surpassing worth! that earliest gives
Sure hopes of racy wine, and in its youth,
Its tender nonage, loads the spreading boughs
With large and juicy offspring that defies
The vernal nippings, and cold sidereal blasts!
Yet let her to the *Red Streak* yield, that once
Was of the sylvan kind, uncivilized,
Of no regard, till Scudamore's skilful hand
Improved her, and by courtly discipline
Taught her the savage nature to forget:
Hence styled the *Scudamorean* plant; whose wine
Whoever tastes, let him with grateful heart
Respect that ancient loyal house.

The same author thus beautifully expresses himself upon the choice of a proper situation for planting apple-trees:—

Whoe'er expects his lab'ring trees should bend
With fruitage and a kindly harvest yield,
Be this his first concern, to find a tract
Impervious to the winds, begirt with hills
That intercept the hyperborean blasts
Tempestuous and cold Eurus' nipping force,
Noxious to feeble buds: but to the wet
Let him free entrance grant, let zephyrs bland
Administer their tepid genial airs;

Nought fears he from the west, whose gentle warmth
Discloses well the earth's all teeming womb,
Invigorating tender seeds, whose breath
Nurtures the orange and the citron groves,
Hesperian fruits, and wafts their odours sweet
Wide through the air, and distant shores perfumes.
Nor only do the hills exclude the winds:
But when the blackening clouds in sprinkling show'rs
Distil, from the high summits down the rain
Runs trickling; with the fertile moisture cheered,
The orchards smile; joyous the farmers see
Their thriving plants, and bless the heav'nly dew.

The different and difficult processes by which the produce of the fruit trees is gradually improved, are thus described in Virgil, as translated by Dryden:—

But various are the ways to change the state
Of plants, to bud, to graft, t' inoculate.
For where the tender rinds of trees disclose
Their shooting gems, a swelling knot there glows.
Just in that space a narrow slit we make,
Then other buds from bearing trees we take:
Inserted thus the wounded rhyme we close,
* * * * * * *
But when the smoother bole from knots is free,
We make a deep incision in the tree;
And in the solid wood the slip inclose,
The battening stranger shoots again and grows;
And in short space the laden boughs arise,
With happy fruit advancing to the skies.
The mother-plant admires the leaves unknown
Of alien trees, and *apples* not her own.

The excellence of *cyder*, as a beverage, is well known: the counties of Devon and Hereford rival each other in the quality of that which they produce, some preferring one and some the other. It was once the practice in Devonshire to suffer the apple-juice to run into vessels of lead, which, being dissolved by the acid of the liquor, became poisonous; and many lives were lost in consequence. The disorder of the bowels which generally attacked those who drank cyder thus contaminated, has been called the *Devonshire*

colic. A spirituous liquor is drawn from cyder by distillation, in the same way as brandy from wine. The particular flavour of this spirit is not the most agreeable, but it may be purified and made wholly insipid. The traders in spirituous liquors are too well acquainted with the value of this spirit, as they can give it the taste of other kinds, and sell it under their names without any danger of detection. There is, also, a wine called cyder wine, made from the juice of apples taken from the press and boiled, and which, being kept three or four years, is said to resemble Rhenish. See more on this subject in T.T. for 1817, p. 305.

All sorts of apple-trees are propagated by grafting or budding upon the stocks of the same kind, for they will not take upon any other sort of fruit tree. The method of growing them from the seed is to procure the kernels: where they are pressed for verjuice or cyder, they are cleared from the pulp, and sown half an inch deep in a bed of light earth. This should be done in December, and they will appear in the spring.

APRICOT *(prunus armeniacus)*. The apricot-tree rises to the height of twenty feet, with a spreading head. The stem is large, and so are the branches, which are covered with a smooth bark. The leaves are large, broad, and almost round, but pointed at the ends, and finely indented about the edges; and the flowers are white. It is not certain of what country this tree is a native. The fruit is highly esteemed. There are seven sorts, which are—1. The *Masculine* apricot, which is the first that becomes ripe; it is a small roundish fruit of a red colour towards the sun: as it ripens, the colour fades to a greenish yellow on the other side; it has a very quick high flavour. The tree is very apt to be covered with flowers, which are often destroyed by coming out too

early in the spring. 2. The *Orange* apricot is the next ripe; it is much larger than the former, and as it ripens changes to a deep yellow colour. The flesh being dry and not high flavoured, it is better for tarts and preserving than for eating raw. 3. The *Algier* apricot comes next into season. This kind is of an oval shape, a little compressed on the sides; it turns to a pale yellow or straw colour when ripe; the flesh is high flavoured and very full of juice. 4. The *Roman* apricot ripens next. It is larger than the Algier, and not so much compressed on the sides; the colour is deeper, and the flesh is not so moist as the former. 5. The *Turket* apricot is still larger than either of the former, and of a globular form. The colour is deeper and the flesh firmer, but not so juicy. 6. The *Breda* apricot came originally from Africa. It is a large roundish fruit: the flesh is soft, juicy, and of a deep orange colour within. This is the best apricot we have; when ripened on a standard, it exceeds all other kinds. 7. The *Brussels* apricot is the last ripe of all the kinds; for when planted against a wall it is seldom fit to eat before the beginning of August, unless the wall has a southern aspect, which spoils its flavour, but this is prejudical to the fruit. Many persons prefer the Brussels to the Breda apricot, but the latter is certainly the most juicy, and has the best flavour when planted as a standard. All the sorts should be planted against walls facing the east or west.

FEBRUARY.

SOME etymologists derive February from *Februa*, an epithet given to Juno, as the goddess of purification; while others attribute the origin of the name to *Februa*, a feast held by the Romans

in this month, in behalf of the manes of the deceased. The Saxons named February *sprout-kele*, on account of the sprouts of the cole-wort which began to appear in this month.

Remarkable Days

In FEBRUARY 1819.

*1. 1684.—ARCHBISHOP LEIGHTON DIED.

He was in his 71st year, having been born at London in 1613, although educated at the University of Edinburgh, where his talents were not more conspicuous than his piety and humble temper. He had been accustomed to express a wish that he might die from home, and at an inn; and his desire was literally gratified, for he closed his long and exemplary life at the Bell, in Warwick Lane, London, far away from his relatives, whose distress, if present at so awful a period, he thought, might too greatly discompose his mind. Dr. Doddridge speaks of him as one of the most eminently devout and pious writers his age has produced:—his works are a treasure to the English language. They continually overflow with love to God, and breathe a heart entirely transformed by the gospel, above the views of every thing but pleasing Him.

2.—PURIFICATION OF THE BLESSED VIRGIN MARY.

This festival is of high antiquity, and the antient christians observed it by using a great number of lights; in remembrance, as it is supposed, of our blessed Saviour's being declared by *Simeon* to be a light to lighten the Gentiles; hence the name of Candlemas Day. This practice continued in England till the second year of Edward the Sixth, when Archbishop Cranmer forbade it by order of the then privy-council. The

Greeks call this festival *Hypante*, which signifies the *meeting*, because Simeon and Anna met our Lord in the Temple on this day. It is called 'Christ's Presentation,' 'the Holiday of Saint Simeon,' and, in the north of England, the 'Wives' Feast-Day.'—See T. T. for 1814, p. 28, and for 1815, p. 43.

PORTUGUESE HYMN *to the* VIRGIN MARY.

[*By John Leyden.*]

Star of the wide and pathless sea,
Who lov'st on mariners to shine,
These votive garments wet to thee,
We hang within thy holy shrine.
When o'er us flushed the surging brine,
Amid the warring waters tost,
We called no other name but thine,
And hoped, when other hope was lost,
Ave Maris Stella!

Star of the vast and howling main,
When dark and lone is all the sky,
And mountain-waves o'er ocean's plain
Erect their stormy heads on high;
When virgins for their true loves sigh,
And raise their weeping eyes to thee,
The star of Ocean heeds their cry,
And saves the foundering bark at sea.
Ave Maris Stella!

Star of the dark and stormy sea,
When wrecking tempests round us rave,
Thy gentle virgin form we see
Bright rising o'er the hoary wave.
The howling storms that seem to crave
Their victims, sink in music sweet;
The surging seas recede to pave
The path beneath thy glistening feet,
Ave Maris Stella!

Star of the desert waters wild,
Who pitying hears the seaman's cry
The God of mercy, as a child,
On that chaste bosom loves to lie;
While soft the chorus of the sky
Their hymns of tender mercy sing,
And angel voices name on high
The mother of the heavenly king,
Ave Maris Stella!

Star of the deep! at that blest name
The waves sleep silent round the keel,
The tempests wild their fury tame
That made the deep's foundations reel:
The soft celestial accents steal
So soothing through the realms of woe,

* * * * * * *
* * * * * * *

Ave Maris Stella!

Star of the mild and placid seas,
Whom rainbow rays of mercy crown,
Whose name thy faithful Portuguese
O'er all that to the depths go down,
With hymns of grateful transport own;
When gathering clouds obscure their light,
And heaven assumes an awful frown,
The star of Ocean glitters bright,
Ave Maris Stella!

Star of the deep! when angel lyres
To hymn thy holy name essay,
In vain a mortal harp aspires
To mingle in the mighty lay!
Mother of God! one living ray
Of hope our grateful bosoms fires
When storms and tempests pass away,
To join the bright immortal quires.
Ave Maris Stella!

3.—SAINT BLASE.

He was Bishop of Sebaste in Armenia, and suffered martyrdom in 316, under the persecution of Licinius, by command of Agricolaus, governor of Cappadocia and the Lesser Armenia. His festival is kept a holiday in the Greek church on the 11th of February. In the holy wars his relics were dispersed over the west, and his veneration was propagated by many miraculous cures, especially of sore throats. He is the principal patron of the commonwealth of Ragusa. No other reason than the great devotion of the people to this celebrated martyr of the church, seems to have given occasion to the woolcombers to choose him the titular patron of their profession; and his

festival is still kept by them at Norwich, and also at Doncaster, with a solemn guild. Perhaps the iron combs, with which he is said to have been tormented, gave rise to this choice. For an account of the anniversaries of the different trades at Montpelier, in France, see T.T. for 1818, p. 29.

5.—SAINT AGATHA.

'The cities of Palermo and Catana dispute the honour of her birth: but they do much better, who, by copying her virtues, strive to become her fellow-citizens in heaven.' (*Butler.*) She suffered martyrdom under Decius, in the year 251.

7.—SEPTUAGESIMA SUNDAY.

The institution of this and the two following Sundays cannot be traced higher than the beginning of the sixth or the close of the fifth century. 'When the words Septuagesima, Sexagesima, and Quinquagesima (seventieth, sixtieth, and fiftieth), were first applied to denote these three Sundays, the season of Lent had generally been extended to a fast of six weeks, that is, thirty-six days, not reckoning the Sundays, which were always celebrated as festivals.'—(*Shepherd.*)

*8. 1576.—ROBERT BURTON BORN,

The celebrated author of the Anatomy of Melancholy, a book full of 'all such reading as never was read,' and the only one which Dr. Johnson said would induce him to rise at six o'clock in the morning to peruse. The following lines by this author are thought to have suggested to Milton many ideas in his '*Il Penseroso*.'

When I goe musing all alone
Thinking of divers things fore-known,
When I would build castles in the air,
Void of sorrow and void of fear,
Pleasing myself with phantasms sweet,
Methinks the time runs very fleet:
All my joys to this are folly,
Naught so sweet as Melancholy.

When I goe walking all alone,
Recounting what I have ill done,
My thoughts on me then tyrannise,
Fear and sorrow me surprise,
Whether I tarry still or go,
Methinks the time moves very slow:
All my griefs to this are jolly,
Naught so sad as Melancholy.

When to my selfe I act and smile,
With pleasing thoughts the time beguile,
By a brook side or wood so green,
Unheard, unsought for, or unseen,
A thousand pleasures doe me bless,
And crown my soul with happiness.
All my joyes besides are folly,
None so sweet as Melancholy.

When I lie, sit, or walk alone,
I sigh, I grieve, making great mone,
In a dark grove, or irksome den,
With discontents and furies then,
A thousand miseries at once
Mine heavy heart and soul ensconce.
All my griefs to this are jolly,
None so sour as Melancholy.[1]

*8. 1817.—FRANCIS HORNER, ESQ. M.P. DIED.

This gentleman, at the age of thirty-eight, was cut off by a pulmonary consumption at Pisa, whither he had ineffectually removed for the recovery of his health. In regard to his talents, reputation, and integrity, it is sufficient to say, that the late Mr. Ponsonby frequently deferred to his judgment; and when that justly celebrated leader thought of retiring, he pointed out Mr. Horner as worthy to be his political successor.

*9. 1815.—DR. CLAUDIUS BUCHANAN DIED, ÆT. 49.

With the name of Dr. Buchanan will ever be associated the cause of promoting Christianity in India. He was a rare instance of zeal, judg-

[1] See the remainder of this poem, prefixed to the 'Anatomy of Melancholy.'

ment, and munificence. His 'Christian Researches' in Asia is a most interesting work; and his prizes for promoting a knowledge of the state of India, by calling attention to the country and its circumstances, evinced a princely generosity. His Three Discourses on the Jubilee show him to have been the christian and the patriot.

*12. 1814.—CUSTOM-HOUSE DESTROYED BY FIRE.

In a very few hours the destruction of this old but useful pile of building was complete. The first custom-house built in London was in 1559; which was burnt down in 1718, and rebuilt the same year: and it was on Saturday, the above date, again totally consumed by fire. The first custom-house, therefore, stood 159 years; the second 96 years. The present building, recently finished, is in a style of magnificence worthy of the immense metropolis and the noble river to which it forms so conspicuous an ornament.

14.—SEXAGESIMA SUNDAY.—*See Septuagesima, p. 38.*

14.—SAINT VALENTINE.

Valentine was an antient presbyter of the church; he suffered martyrdom in the persecution under Claudius II, at Rome. Being delivered into the custody of a man named Asterius, one of whose daughters was afflicted with blindness, he restored the use of her sight, and, by this miracle, converted the whole family to Christianity. They afterwards suffered martyrdom. Valentine, after a year's imprisonment at Rome, was beaten with clubs, and then beheaded, in the *Via Flaminia*, about the year 270.—The modern celebration of this day, with young persons, is well known. See T.T. for 1814, p. 32 and p. 33, *note*, for an elegant *jeu d'esprit* on this subject; T.T. for 1815, p. 52; and T.T. for 1817, p. 40.

*14. 1780.—SIR WILLIAM BLACKSTONE DIED, The learned author of 'Commentaries on the Laws of England,' which are at once celebrated for the perspicuity and elegance of their style, and (generally speaking) for their sound and constitutional principles. He is charged, however, with softening some passages in his first edition, to make them more agreeable to the crown lawyers. His 'Farewell to the Muse' contains some pleasing lines. We select the following:—

As by some tyrant's stern command,
A wretch forsakes his native land,
In foreign climes condemned to roam,
An endless exile from his home;
Pensive he treads the destined way,
And dreads to go, nor dares to stay;
Till on some neighb'ring mountain's brow
He stops and turns his eyes below;
There, melting at the well-known view,
Drops a last tear and bids adieu;
So I thus doomed from thee to part,
Gay queen of fancy and of art,
Reluctant move with doubtful mind,
Oft stop and often look behind!
Companion of my tender age,
Serenely gay and sweetly sage,
How blithesome were we wont to rove,
By verdant hill or shady grove;
Where fervent bees with humming voice
Around the honied oak rejoice;
And aged elms with awful bend
In long cathedral walks extend.
Lulled by the lapse of gliding floods—
Cheered by the warbling of the woods;
How blest my days, my thoughts how free,
In sweet society with thee!
Then all was joyous—all was young,
And years unheeded rolled along.
But now the pleasing dream is o'er,
These scenes must charm me now no more!
Lost to the field and torn from you—
Farewell! a long—a last adieu!
Me wrangling courts and stubborn *law*
To smoke and crowds, and cities draw;

There selfish faction rules the day,
And pride and av'rice throng the way;
Diseases taint the murky air,
And midnight conflagrations glare:
Loose revelry and riot bold
In frighted streets their orgies hold;
Or when in silence all is drowned,
Fell murder walks her lonely round:
No room for peace—no room for you:
Adieu, celestial nymphs, adieu!

***15. 1708.—JOHN PHILIPS DIED,**

Author of 'The Splendid Shilling,' 'Blenheim,' and 'Cyder;' which possess considerable merit as poems: and he is a strenuous advocate for *smoking*, to which he was himself much addicted.

***17. 1571.—REMOVAL OF MARCLEY HILL.**

On this day, an earthquake in Herefordshire removed Marcley Hill to a considerable distance from the place where it stood. It continued in motion two or three days, and either carried away or overturned every thing which impeded its progress. The ground thus moved was about twenty-six acres.—*(Speed* and *Camden.)* And in 1583, according to Stow, a similar prodigy happened in Dorsetshire.

The sylvan scene
Migrates, uplifted; and, with all its soil,
Alighting in some distant fields, finds out
A new possessor. COWPER.

Philips, in his 'Cyder,' thus notices the removal of Marcley Hill:—

I nor advise nor reprehend the choice
Of MARCLEY HILL; the apple nowhere finds
A kinder mould: yet 'tis unsafe to trust
Deceitful ground: who knows but that once more
This mount may journey, and, his present scite
Forsaking, to thy neighbour's bounds transfer
The goodly plants[1], affording matter strange

[1] And settle on a new freehold,
As MARCLEY HILL had done of old. HUDIBRAS.

For law debates? If therefore thou incline
To deck this rise with fruits of various taste,
Fail not by frequent vows to implore success:
Thus piteous heaven may fix the wand'ring glebe [1].

The above, however, are not solitary instances of these phenomena, as will be seen from the following extracts from the Annual Register for 1764 and 1773:—

'At Ashton, in Gloucestershire, a large tract of land, of near sixteen acres, slipt lately (1764) from that side of Breedon Hill, in the parish of Grafton, and has entirely covered several pasture grounds, and a considerable space of the common field at the bottom of the hill. Some stiles, that were in the foot-way to Ashton, and are left standing, are now seventy paces distant from the paths to which they belonged. The tops of trees, twenty feet high, which grew at the lower part of the hill, are now scarcely two feet above ground; from whence it is thought the moving earth was near twenty feet in depth. This very extraordinary accident is attributed to the incessant rains, as the soil, now uppermost, is of a boggy nature.'

'Amsterdam, May 10 (1773).—Letters from Batavia, of the 16th of September last, advise, that on the 11th of August was observed, at midnight, a bright cloud that covered the mountain in the district of Cheribon, and that, at the same time, several reports were heard like those of a gun; that the people, who dwelt on the top and at the foot of the mountain, not being able to fly fast enough, a great part, almost three leagues in circumference, detached itself under them; that afterwards it was seen rising and falling like the rolling waves of the sea, and emitting globes

[1] Butler's Chronological Exercises, p. 52, an extremely useful and pleasant work.

of fire so luminous that they were seen from afar, and rendered the night as clear as day; that the losses occasioned by this phenomenon were most considerable and melancholy, 2140 persons, foreigners and natives, with 1500 head of cattle, besides a great number of horses, goats, and fowls of every kind, having perished; that thirty-nine negro habitations were destroyed, and the plantations of coffee, indigo, &c., buried in the earth; that in the district of Panimbam, where this mountain is situated, there remained only a fifth part of the inhabitants; and that the devastation occasioned by this accident was felt at the distance of seven leagues round.'

*18. 1546.—MARTIN LUTHER DIED.

While the bull of Leo X, executed by Charles V, was thundering throughout the empire, Luther was safely shut up in his castle (of Wittemberg, where he had been secreted by the Elector of Saxony), which he afterwards called his Hermitage, and his Patmos. Here he held a constant correspondence with his friends at Wittemberg, and was employed in composing books in favour of his own cause, and against his adversaries: He did not, however, so closely confine himself, but that he frequently made excursions into the neighbourhood, though always under some disguise or other. One day he assumed the title and appearance of a nobleman: but it may be supposed that he did not act his part very gracefully; for a gentleman who attended him under that character to an inn upon the road, was, it seems, so fearful of a discovery, that he thought it necessary to caution him against that absence of mind peculiar to literary men; bidding him 'keep close to his sword, without taking the least notice of books, if by chance any should fall in his way.' He used, sometimes, even to go out a hunting with those few who were in his secret; which,

however, we may imagine, he did more for health than for pleasure, as, indeed, may be collected from his own curious account of it. 'I was,' says he, 'lately two days a hunting, in which amusement I found both pleasure and pain. We killed a brace of hares, and took some unhappy partridges; a very pretty employment truly for an idle man! However, I could not forbear theologizing amidst dogs and nets; for, thought I to myself, do not we, in hunting innocent animals to death with dogs, very much resemble the devil, who, by crafty wiles and the instruments of wicked priests, is perpetually seeking whom he may devour? Again: we happened to take a leveret alive, which I put into my pocket, with an intent to preserve it; yet we were not gone far before the dogs seized upon it, as it was in my pocket, and worried it. Just so the pope and the devil rage furiously to destroy the souls that I have saved, in spite of all my endeavours to prevent them. In short, I am tired of hunting these little innocent beasts; and had rather be employed, as I have been for some time, in spearing bears, wolves, tigers, and foxes; that is, in opposing and confounding wicked and impious divines, who resemble those savage animals in their qualities.'

21.—QUINQUAGESIMA SUNDAY.—*See Septuagesima, p.* 38.

23.—SHROVE TUESDAY.

This is called 'Fastern's Een' and Pancake Tuesday. *Shrove* is the preterite of *shrive,* an antiquated word, which signifies to hear or make confession. On this day it was usual for the people to *confess,* that they might be the better prepared for the observation of the ensuing season of penitence, and for receiving the sacrament at Easter. It was afterwards converted into a day of idle sports and amusements; and within these few years, in many parts of England, its anniver-

sary was distinguished by riot and drunkenness, by bull-baiting, cock-fighting, and such other diversions as were calculated to promote cruelty, inhumanity, and every thing the most opposite to the virtues which it was the intention of the church to teach and encourage. These barbarous customs, we fear, are not wholly abolished.—See T.T. for 1814, p. 35, and for 1815, p. 45. The Popish Carnival commences from Twelfth-day, and usually holds till Lent. At Rome, the Carnival lasts for nine days, and it is nowhere seen in such perfection as at this place.—See it described at length in our volume for 1815, p. 48.

24.—ASH WEDNESDAY.

Formerly Lent began on the Sunday after *Quinquagesima*, i. e. our first Sunday in Lent, and ended at Easter, containing in all 42 days; and subtracting the six Sundays which are not fasts, there remained only 36 fasting-days, the tenth part of 360, the number of days in the antient year, then considered as a tythe of the year consecrated to God's service. To these 36 fasting-days, however, of the *Old-Lent*, Gregory added four days more, to render it equal to the time of our Saviour's fasting, causing it to begin on *Ash Wednesday*, three days after *Quinquagesima*; and thus it has remained ever since. Lent is not of apostolic institution, nor was it known in the earlier ages of the Christian church. For some remarkable fasts, and directions for 'keeping the true Lent,' see T.T. for 1814, p. 39.

24.—SAINT MATTHIAS.

Matthias was, probably, one of the seventy disciples, and was a constant attendant upon our Lord, from the time of his baptism by St. John until his ascension. Upon the death of Judas, St. Peter recommended to the consideration of the Christians assembled at Jerusalem the necessity of supplying this vacancy: and two were appointed; Joseph, called Barsabas, who was sur-

named *Justus*, and Matthias. It was determined by lot in favour of the latter, who was accordingly numbered with the eleven apostles. Matthias employed the first years of his ministry in Judea; afterwards he travelled eastward, his residence being principally, according to St. Jerome, near the river Apsarus, and the haven Hyssus. Here he continued for some time, but was at last murdered by the barbarous natives. The gospel and traditions published under his name are considered spurious.

*24. 1525.—BATTLE OF PAVIA.

That *war* is a complication of physical and moral evil, few will, in theory, deny, with how little soever compunction or reluctance potentates have, in every age, resorted to it as the *amende honorable* for the most trifling grievances. Viewed, indeed, as a mere game, combined of skill and hazard, it is of all pursuits the most stirring and glorious. Abstracted from their consequences,

> The triumph, and the vanity,
> The rapture of the strife,—
> The earthquake voice of victory,

must constitute a state of turbulent excitement, in which we can conceive some minds may find an appropriate delight. All other actions and circumstances of life must, compared with the joys of battle, appear insipid. The fearful alternation of the mind between triumph and despair, the vastness of the stake, and the intensity of effort to which all the energies of nature seem then to be wrought up;—above all, those indefinite ideas of martial glory, which have been found to prevail over all fear and all suffering, must give to the hour of actual contest a strange delicious ecstasy. Such is the notion of war, which it seems to be part of our education to imbibe.

With martial achievements and martial glory, the studies of our earliest youth have taught us to associate ideas of manliness, true heroism, and moral grandeur: and from the age of Homer to that of modern romance, poetry has been employed in throwing over scenes of horrible destruction an air of chivalrous enterprise and picturesque sublimity. But to those who know *war* in its details of enormity and misery, who have followed in the rear of its ravages, and tracked its steps by the whitening bones of its victims; to those who, after the conflict, have listened, in the silence of midnight, to the faint groans or dying yells which bespoke the remains of life in some hundreds of agonizing sufferers; or who, in moods of deeper abstraction, have seemed to hear the sullen plunge which each individual spirit, when forced from its every lurking place of life, has made in the dark waters that bound mortality, the shriek of separation and the awful murmurs of eternity; to those who think of war as connected with these details, and with the widow's curse and the orphan's wretchedness, it is, indeed, an unutterable evil.—*(M. Gregoire.)*

*28. 1757.—EDWARD MOORE DIED.

He was the author of the tragedy of the 'Gamester,' one of the most interesting, moral, and instructive dramas upon the stage. His comedy of the 'Foundling,' and his 'Fables for the Female Sex,' have also great merit.

Astronomical Occurrences

In FEBRUARY 1819.

THE Sun enters Pisces at 22 m. after 10 on the morning of the 19th of this month; and he rises and sets during the same period as stated in the following

TABLE

Of the Sun's Rising and Setting every fifth Day.

February	1st,	Sun rises	28	m.	after	7.	Sets	32	m.	after	4
	6th,	- - -	19	-	- -	7	- -	41	-	- -	4
	11th,	- - -	10	-	- -	7	- -	50	-	- -	4
	16th,	- - -	1	-	- -	7	- -	59	-	- -	4
	21st,	- - -	51	-	- -	6	- -	9	-	- -	5
	26th,	- - -	41	-	- -	6	- -	19	-	- -	5

Equation of Time.

When apparent time is known as indicated by a good sun-dial, and mean time is required, add the numbers in the following table for every fifth day of the month to the time as marked by the dial.

TABLE.

			m.	*s.*
Monday,	Feb. 1st,	to the time by the dial *add*	13	55
Saturday,	- - - 6th,	- - - - - - - - - - - -	14	26
Thursday,	- - - 11th,	- - - - - - - - - - - -	14	36
Tuesday,	- - 16th,	- - - - - - - - - - - -	14	28
Sunday,	- - - - 21st,	- - - - - - - - - - - -	14	1
Friday,	- - - - 26th,	- - - - - - - - - - - -	13	19

Phases of the Moon.

First Quarter	2d	day, at	24	m.	after	1	morning.
Full Moon -	10th,	- -	15	-	-	6	- - -
Last Quarter	17th,	- -	39	-	-	8	evening.
New Moon -	24th,	- -	53	-	-	11	morning.

Moon's Passage over the first Meridian.

The Moon's centre will pass the first meridian at the following times during this month; and which will therefore afford favourable opportunities for observing her in that position, to such as are not very distant from that meridian, if the weather be clear.

February	1st,	at	23	m.	after	5	in the evening.
	2d,	-	8	-	-	6	- - - - -
	3d,	-	56	-	-	6	- - - - -
	4th,	-	46	-	-	7	- - - - -
	5th,	-	36	-	-	8	- - - - -
	6th,	-	28	-	-	9	- - - - -
	7th,	-	18	-	-	10	- - - - -
	8th,	-	7	-	-	11	- - - - -
	17th,	-	6	-	-	5	morning.
	18th,	-	1	-	-	6	- - - - -
	19th,	-	1	-	-	7	- - - - -

Phases of Venus.

On the 1st of this month, this beautiful planet will shine with great brilliancy, and the breadth of her illuminated part will be 3·2345, and of her dark part 8·7655 digits.

By comparing the digits of her illumination with the result obtained for her greatest brilliancy by the following solution, it will be seen that, on account of her nearness to the Earth at this time, she will display a greater brightness than in any other part of her orbit; she has, indeed, under similar circumstances, frequently been seen in the day-time, and even when the Sun was shining with great brightness.

Eclipses of Jupiter's Satellites.

There will be several eclipses of Jupiter's satellites this month; but none of these will be visible at the Royal Observatory, or its neighbourhood.

Other Phenomena.

The Moon will be in conjunction with β in Taurus at 26 m. after 7 in the evening of the 4th of this month; with Pollux at 23 m. after 6 on the evening of the 7th; and with Saturn at 7 m. after 11 in the morning of the 25th. Mars and Venus will be in conjunction at 1 m. past 5 in the evening of the 11th, at which time Mars will be 8′ south of Venus. Mars and Jupiter will also be in conjunction at 41 m. after 12 on the 13th, when Mars will be 36′ south of Jupiter.

On the PHASES *of* MERCURY *and* VENUS.

[Concluded from p. 23.]

As the planets are at very different distances from the Earth during different periods of their revolutions, they do not always appear the most brilliant when the whole of the enlightened disc is turned towards the Earth; for the intensity of

light varies inversely as the square of the distance of the planet from the Earth, and the diminution from this cause frequently more than counterbalances the increase of brilliancy arising from the increased area of the illuminated part of the disc. On this account, to determine the situation of a planet at the moment of its greatest brilliancy becomes an interesting problem. No. 349 of the Philosophical Transactions contains a solution of this problem, by Dr. Halley, as it applies to Venus. But as it necessarily requires the aid of fluxions, in order to determine the *maximum*, and most of our readers are unacquainted with that science, we shall only give the result of his solution.

Denoting the distance between the Sun and the Earth by a, that between the Sun and Venus by b, and between the Earth and Venus by x; the first two being of course known, and the last an unknown quantity; then the solution of the problem gives

$$x=(3a^2+b^2)^{\frac{1}{2}}-2b.$$

In applying this result to the case in question, we may take $a=1$, and then $b=\cdot72333$; and these values subsituted in the above formula, give $x=\cdot43036$. These numbers therefore express the ratio of the respective sides of the triangle ESV, in Fig. 1; whence the angles are easily found by the elements of plane trigonometry. This gives the angle ESV $=22^\circ\ 21'$, and SEV $=39^\circ\ 44'$; and consequently their sum is $62^\circ\ 5'$, the natural versed sine of which is $\cdot5318$; and multiplying this by 6, we have 3·1908 digits for the breadth of the enlightened part, and which is therefore a little more than a fourth part of the whole apparent diameter of the planet.

If we apply the same solution to Mercury, taking, as before, $a=1$, we have $b=\cdot3871$, and by substituting these, $x=1\cdot0006$. Then the angle

ESV, found as in the former case, is 78° 55′; and SEV=22° 19′; and consequently their sum is 101° 14′, the versed sine of which is 1·1948; which being multiplied by 6, gives 7·1688 digits. Mercury therefore appears the brightest when about $\frac{7}{10}$ths of his apparent diameter is illuminated. This difference between the enlightened phase of Mercury and that of Venus, at the time of their greatest brilliancy, arises from the circumstance, that the distance of Mercury from the Earth varies much less than that of Venus; and consequently the intensity of his light is more constant.

On the FORM *of* SATURN'S RING, *and the* ORBITS *of his first four* SATELLITES.

We have already stated some of the principal circumstances respecting Saturn's ring, and shall here only add the method of calculating its form for any given time. This ring sometimes appears like a dark line crossing the disc of the planet, and at others it appears to be elliptical, and to surround the body of the planet; so that the opening between the planet and the external part of the ring may easily be seen by means of a good telescope. The greatest value of the conjugate diameter is about half that of its transverse, and it varies from this to nothing. The ring of Saturn, like the Earth's equator, being considerably inclined to the plane of the Earth's orbit, sometimes one side, and sometimes the other, will be illuminated by the solar rays; by which means, they both become alternately visible to the inhabitants of the Earth. During the change of illumination from the north to the south side of the ring, its plane coincides with that of the Earth's orbit, and then it becomes altogether invisible to us.

In order to find the figure of Saturn's ring at any given time, add 13° 43′ 30″ to his geocentric

longitude for the time required; and with this sum, as an argument, enter the following small table, in which the signs are inserted at the top or bottom, and the degrees on the sides, and the corresponding numbers will be the conjugate axis of the ring, its transverse being 1·000. This result, however, requires a correction, depending upon the geocentric latitude of the planet. To obtain this correction, the latitude must be reduced to minutes, and $\frac{1}{4}$th part applied to the number above found, with the sign +, if his latitude be south; but with the sign — if it be north, and the result will give the apparent conjugate diameter of the ring.

TABLE

For finding the Form of Saturn's Ring, and the Orbits of his first four Satellites.

ARGUMENT.				
Longitude of Saturn + 13° 43′ 30″				
Degrees	Signs O VI — +	Signs I VI — +	Signs II VIII — +	Degrees
	0·000	0·260	0·451	30
3	0·027	0·284	0·464	27
6	0·054	0·306	0·476	24
9	0·081	0·328	0·486	21
12	0·108	0·348	0·495	18
15	0·135	0·368	0·503	15
18	0·161	0·387	0·509	12
21	0·187	0·405	0·514	9
24	0·212	0·421	0·518	6
27	0·236	0·437	0·520	3
30	0·260	0·451	0·521	0
Degrees	XI V + — Signs	X IV + — Signs	IX III + — Signs	Degrees

As an example of the preceding method of finding the ratio of the diameters of Saturn's ring,

let it be required to find his conjugate axis on the 1st of January 1819; then we have

Saturn's geocentric longitude - - - - - - - -	11^s.	13°	23′
Add the constant quantity - - - - - - - - -		13	43
	Argument	11	27 6
Which corresponds in the table to - - - - - -	+ 0·028		
Correction for the latitude $\frac{120}{4}$ - - - - - - -	+ 0·030		
The conjugate axis of the ring - - - - - - -	+ 0·058		

Hence, as the ratio of the two axes of the ring at this time are ·058 to 1, it will appear only like a line. When the sign + is prefixed to the result, it indicated that it is the upper surface or northern side of the ring that is then visible; but when — is employed to characterise the result, it shows that it is the southern face of the ring that is then seen. The result thus obtained also applies to the orbits of the first four of Saturn's satellites. When the result is equal 0, Saturn's ring totally disappears, the edge being too thin to reflect sufficient light to render it visible.

The Naturalist's Diary

For FEBRUARY 1819.

Reviving nature seems again to breathe,
As loosened from the cold embrace of death.

In the course of this month all nature begins, as it were, to prepare for its revivification. God, as the Psalmist expresses it, 'renews the face of the earth;' and animate and inanimate nature seem to vie with each other in opening the way to spring. About the 4th or 5th, the woodlark [1]

[1] O stay, sweet warbling woodlark, stay,
Nor quit for me the trembling spray;
A hapless lover courts thy lay,
Thy soothing fond complaining.

(alauda arborea), one of our earliest and sweetest songsters, renews his note; a week after, rooks begin to pair; the thrush sings; and the yellow-hammer is heard[1]. The chaffinch sings; the green wood-pecker *(picus viridis)* makes a loud noise; and the redbreast continues to warble. Turkey-cocks strut and gobble. Partridges *(tetrao perdix)* begin to pair; the house pigeon has young; field crickets open their holes; missel thrushes couple; and wood owls hoot;—gnats play about, and insects swarm under sunny hedges; frogs *(rana temporaria)* croak, and the stone curlew *(otis œdicnemus)* clamours. By the latter end of this month, the raven *(corvus corax)* has generally laid its eggs, and begun to sit. Moles *(talpa europæus)* commence their subterraneous operations.—See T.T. for 1814, p. 49, and our last volume, p. 43.

The *weather* is usually variable in this month, but most inclined to frost and snow, and the thermometer is often down below the freezing point. The severe weather generally breaks up with a sudden *thaw*, accompanied by wind and rain; torrents of water pour from the hills, and the snow is completely dissolved. Rivers swell and

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Again, again that tender part,
That I may catch thy melting art;
For surely that wad touch her heart,
Wha' kills me wi' disdaining.

Say, was thy little mate unkind,
And heard thee as the careless wind?
Oh, nocht but love and sorrow joined
Sic notes o' woe could wauken.

Thou tells o' never-ending care;
O' speechless grief, and dark despair;
For pity's sake, sweet bird, nae mair!
Or my poor heart is broken!

BURNS.

[1] See our last volume, p. 43, for a pleasing poetical illustration.

inundate the surrounding country, often carrying away bridges, cattle, mills, gates, &c., and causing great injury to the farmer. Mrs. Cowley's 'Petition after Thaw-Flood,' in Devonshire, affords a good description of the appearances of nature at this season, of the ravages occasioned, and of the losses suffered by the poor. We have only space for a few lines:—

The sportive winds sprang up on high,
With feathery snow played through the sky;
The earth was clothed, the hills grew white,
The shrinking vales gave gelid light;
The blanched oak waved his hoary crown,
And shook his silver garland down.
Green wheat, just piercing through the ground
With tender blade from root profound,
A chilling element found there,
That checked its rise to live in air.

The spirit of dread storms awoke,
The roaring winds their magic spoke,
Transformed to torrents settled snow,
And bade the dark-browed tempests grow.
O'er Devon's hills fierce waters gushed,
And boisterous on the meadows rushed;
They drenched the woodlands, choaked the plain,
Till all appeared one billowy main;
Black clouds shot on in dread array,
And chased the last remains of day.
No spangled vault relieved the sight,
No soothing moonlight graced the night,
But there the *Pleiades* were seen,
Triumphant glittering and keen.

The flowers of the crocus *(crocus vernus)* appear, before their leaves are grown to their full length; the barren strawberry *(fragraria sterilis)*; the laurustinus *(viburnum tinus)*; and the yew-tree *(taxus baccata)*, are in flower.

SONNET *to the* YEW-TREE.
[*By Dr. J. Leyden.*]

When Fortune smiled, and Nature's charms were new,
I loved to see the *oak* majestic tower,—
I loved to see the *apple's* painted flower,

Bedropt with pencilled tints of rosy hue:
Now more I love thee, melancholy YEW,
Whose still green leaves in solemn silence wave
Above the peasant's rude unhonoured grave,
Which oft thou moisten'st with the morning dew.
To thee the sad—to thee the weary fly;
They rest in peace beneath thy sacred gloom,
Thou sole companion of the lonely tomb;
No leaves but thine in pity o'er them sigh:
Lo! now to Fancy's gaze thou seem'st to spread
Thy shadowy boughs, to shroud me with the dead.

The elder-tree *(sambucus nigra)* begins to put forth its flower buds, and the catkins of the hazel are very conspicuous in the hedges. The gooseberry bush *(ribes grossularia)* and the red currant *(ribes rubrum)* show their young leaves about the end of the month. The hepatica *(anemone hepatica)*, unless the weather be severe, gives brilliance to the garden with its bright pink flowers; and the hounds-tongue *(cynoglossum)* with its more modest flowers of pink or light blue. Many plants appear above ground in February, but few flowers, except the snowdrop, are to be found. This 'icicle changed into a flower' is sometimes fully opened from the beginning of the month.

The husbandman is now eager to commence the work of *ploughing*, which important business is finished in this month, if the weather permit.

Sweet then the ploughman's slumbers, hale and young,
When the last topic dies upon his tongue;
Sweet then the bliss his transient dreams inspire,
Till chilblains wake him, or the snapping fire.
He starts, and, ever thoughtful of his team,
Along the glittering snow a feeble gleam
Shoots from his lantern, as he yawning goes
To add fresh comforts to their night's repose;
Diffusing fragrance as their food he moves,
And pats the jolly sides of those he loves.
Thus, full replenished, perfect ease possest,
From night till noon, alternate food and rest,
No rightful cheer withheld, no sleep debarred,
Their each day's labour brings its sure reward.

Yet, when from plough or lumb'ring cart set free,
They taste awhile the sweets of liberty,
E'en sober *Dobbin* lifts his clumsy heels,
And kicks, disdainful of the dirty wheels;
But soon, his frolic ended, yields again
To trudge the road, and wear the clinking chain.

BLOOMFIELD.

Pheasant-shooting usually terminates about the 1st, and partridge-shooting about the 15th, of this month.

Among the juvenile spots of this month, skating and *sliding* are still practised, if a hard frost continue; and, in foreign countries, where the winters are more severe, and the frosts more durable, *sledge-processions* are common. A recent traveller (Dr. Bright) gives an amusing description of one at Vienna, during the winter of 1814-15. 'The climate,' he says, 'was then nearly as changeable as that of London: from the middle of December, however, till the middle of February, there was sufficient frost to keep the ground almost continually covered with snow. The thermometer was often at 25° of Fahrenheit, during the day, and at midnight seldom below 20°. At this period the streets of Vienna were crowded with sledges, the greater part of the wheel carriages having disappeared; even the hackney coaches had been taken from their wheels to be hung upon sledges. The horses' heads were adorned with plumes, and, as they passed over the hardened snow without occasioning any sound, it became necessary to provide them with bells, which gave warning of their approach. From 50 to 100, arranged in order, upon a piece of leather or velvet, placed upon the horses' shoulders, produced a lively and agreeable jingling sound on every motion of the animal. The scene afforded by these sledges is much more gay than that produced by an equal number of wheeled carriages: there is always some emula-

tion in adorning them with plumes or coloured cloths; and among the nobility, the vanity of possessing rich and beautiful sledges was once carried to such excess, and produced such heavy expences, that it was discouraged by the court. On the present occasion, however, the emperor invited his nobility to assist in forming a magnificent procession of these vehicles for the amusement of his guests.

'On the day appointed for this parade, the streets were crowded with an expecting multitude. The greatest good order prevailed; arising, in part, from the accustomed subjection of an Austrian mob, and, in part, from the sedate and orderly feeling communicated by a Sunday dress. At two o'clock the procession began to move through the streets: it was, indeed, singularly beautiful. There were nearly forty sledges prepared for the purpose, fitted up and adorned in the most splendid manner. They all varied in colour; green, blue, red of every shade, covered with ornamental work of gold and silver, and lined within with velvet and rich fur. They were generally built like light cars, for two persons, a gentleman driving, and a lady sitting by his side; the former dressed in full uniform, the latter with high plumes of feathers, rich dresses, and a notable quantity of rouge. The greater part of this assembly were royal persons; two emperors, three kings, two or three hereditary princes, several archdukes; among the ladies were two empresses, two queens, archduchesses and princesses; and with them were observed two of our own nobility. Each sledge was drawn by a single pair of horses, covered with richly embroidered cloths of gold, with plumes upon their heads and necks, and a great mass of silver or gilded bells hanging in the usual manner across their shoulders. A

servant in a rich fur cloak stood behind each sledge, and between each, three or four equerries attended, in the uniforms and liveries of the emperor, or of their respective masters. A band of military music preceded on a large sledge constructed for the purpose, and a similar band followed. A body of horse soldiers went before the whole, and another closed the procession.

'This brilliant pomp passed and repassed through all the principal streets of Vienna; then, leaving the town, proceeded to a palace of the emperor at some distance, where a magnificent dinner and a theatrical exhibition had been prepared; and, at ten o'clock, the procession returned by the light of torches. As it approached over the glacis, and open space between the walls of the city and its suburbs, the effect was very striking. The ground was covered with deep snow, and the winding course of the procession was marked like a river of fire, by the flames of the moving torches. When they entered the streets, the effect was in a great degree lost; and, after a short circuit, the ladies were conducted to their respective habitations.'

The few fine days towards the latter end of February afford many opportunities of cultivating our knowledge of Nature, even in her minutest works. The results of a morning's walk at this season are given at length in T.T. for 1817, p. 53.

In this month, early potatoes are set, hedges repaired, trees lopped, and wet lands drained. Poplars, willows, osiers, and other aquatics, are planted.—Lines omitted in January:

Downe with your timber wood, and let it not stand,
Remembering for barlie to fallowe your land;
From hedges and trees brush all needless sprigs,
And now go a birding with nets and lime twigs.
If sore sicknesse greeve thee,
Let physicke relieve thee.

DESCRIPTION OF FRUIT TREES.

[Continued from p. 34.]

CHERRY-TREE (*prunus cerasus*).—The different sorts of this well-known tree are very numerous. It has been observed to grow to the height of eighty-five feet; and when it is of a large size, its wood is esteemed for making chairs, stools, cabinets, tables, and musical instruments. It polishes well, and is very useful for turners, and is often stained to imitate mahogany. It grows generally in a sandy soil, and an elevated situation. The gum that exudes from it is equal to gum arabic; and it is recorded in history that more than one hundred men were kept alive during a siege, without any other food than a little of this gum taken sometimes into the mouth, and suffered gradually to dissolve. The *garden cherry* tree seldom exceeds twenty feet in height, but that sort called the black cherry often rises to fifty feet, with a more erect and stately head. It is much cultivated in the Chiltern part of Buckinghamshire, and makes a beautiful appearance in the spring, putting forth its blossoms at the same time that the beech is in leafing.

The common *Kentish cherry* is thought to be the original of all the varieties now cultivated in the English gardens. It is sufficiently distinguished by its peculiarities, which is readily perceived. The early May cherry is the first that ripens, and valuable on that account. Another sort, called the *May Duke*, which is larger than the May cherry, ripens next after it, and is a more valuable fruit. It is succeeded by the *Arch Duke*, which is an excellent cherry when permitted to ripen. It should be planted against a north wall, and ought not to be gathered before Midsummer. It would be better still if suffered to hang

till the middle of July, even in the neighbourhood of the metropolis, where it ripens a fortnight sooner than in places forty miles distant. Other favourite sorts of cherries are the Flemish, the Red Heart, the White Heart, the Black Heart, the Black Kent, the Amber Heart, the Oxheart, and the *Morello*. The last is generally planted against a north wall, and used for preserving; but if planted in a south west aspect, and suffered to hang till the middle of August, it will furnish the most delicious fruit for the table.

The *Wild Cherry Trees* are very suitable for ornamenting parks, as they grow to a large size, and make a beautiful appearance. In spring, when they are in flower, they are extremely handsome. The fruit affords good food for the feathered race, and the wood is useful for turners. They will thrive better in poor land than most other sorts. The French often plant them for avenues to their houses, and cultivate them in their woods to cut, while young, for hoop-making. The *Bird* cherry tree rises to the height of ten or twelve feet, and will grow to nine or ten inches diameter in the trunk. The branches grow wide and scattering, and are covered with a purplish bark. The leaves are egg-shaped, but pointed at the end, and slightly jagged all round the edges, like the teeth of a small saw. The flowers, which are white and smaller than those of the common cherry tree, have a strong smell, which is offensive to most persons. It is a very ornamental shrub, for groves or fields; but the fruit is nauseous, although, when bruised and infused in wine or brandy, it gives an agreeable flavour to those liquors. The berries are greedily eaten by birds, and from this circumstance the common name of the tree is derived. The wood being smooth and tough, is excellent for knife and whip handles. This species of fruit tree has been cultivat-

ed in England for nearly four hundred years; but it is not known from what country it was imported.

CURRANT TREE (*Ribes rubrum*).—This tree has been long cultivated in our gardens, and greatly improved. At present we have the following varieties: The common sort with small red fruit; another with pale fruit, commonly called the champagne currant, differing only in being of a pale red or flesh colour; the taste is the same, but the colour makes an apparent variety for the table. The introduction of the white and red Dutch currants has almost banished the original old sorts out of the English gardens. The fruit is very generally accepted, either as nature presents it, or made into a jelly, with equal weights of picked currants and pure sugar. The *black* currant is distinguished from the other sorts by its humbler growth and strong smelling leaves. The flowers are turban-shaped, of a rich brown red colour. The berries have a very peculiar flavour, which many persons dislike, and to which perhaps an equal number are partial. They are commonly eaten in puddings in some parts of England, and make a tart little inferior to the cranberry. The juice is frequently boiled down to an extract, with the addition of a small proportion of sugar, and is then called *Rob;* which is much used to cleanse and lubricate inflamed sore throats. Their excellency in this complaint has caused them to be vulgarly called *quinancy berries*. The jelly in common use has, however, too much sugar mixed with it to answer any medicinal purpose. The berries are sometimes put into brandy in the same way as black cherries; and the Russians make a wine of black currants, either by themselves or fermented with honey; and either with or without spirits. The Siberians make a drink from the leaves, which, when young, will tinge common spirits so as to

resemble brandy. An infusion of the leaves is also said to resemble that execrable poison *green* tea, and to some persons is peculiarly agreeable. The common opinion is, that the black currants are the most wholesome of all the sorts; and this seems to be confirmed by experience, although they are all very friendly to most constitutions, especially in feverish, bilious, and scorbutic habits. This very useful fruit appears not to have been at all known to the Greeks or Romans; even the southern nations of Europe have no appropriate name for them to the present day: our English name currant is evidently derived from the great similitude of this fruit to that of the small grape of Zante, or the common grocer's *corinths*, which has been corrupted into *currants*.—See GOOSEBERRY.

MARCH.

AMONG the Romans, March, from Mars, was the first month, and marriages made in this month were accounted unhappy. The Saxons called March *lent-monat*, or *length moneth*, 'because the days did first begin, in length, to exceed the nights.'

Remarkable Days

In MARCH 1819.

1.—SAINT DAVID.

SAINT David was the great ornament and pattern of his age. He spoke with much force and energy, but his example was more powerful than his eloquence; and he has in all succeeding ages been the glory of the British church. He continued in the see of St. David's many years; and

having founded several monasteries, and been the spiritual father of many saints, both British and Irish, he died about the year 544, at a very advanced age.

The leek worn on this day by Welshmen is said to be in memory of a great victory obtained by them over the Saxons; they, during the battle, having leeks in their hats, to distinguish themselves, by order of St. David. Another account adds, that they were fighting under their King Cadwallo, near a field that was filled with that vegetable.

2.—SAINT CHAD.

St. *Ceadda* or Chad was educated in the monastery of Lindisfarne, under St. Aidan; was afterwards Bishop of Lichfield, and died in the great pestilence of 673. Bede assures us that he zealously devoted himself to all the laborious functions of his charge, visiting his diocess on foot, preaching the gospel, and seeking out the poorest and most abandoned persons to instruct and comfort, in the meanest cottages and in the fields.—See further particulars of this Bishop in T.T. for 1815, p. 76.

3.—EMBER WEEK.

There are *four* Ember Weeks in the year, namely, after the first Sunday in Lent, after the feast of Pentecost, after the 14th of September, and after the 13th of December. It is enjoined by a canon of the church, 'that Deacons and Ministers be ordained, or made, but only on the Sundays immediately following these Ember feasts.'—(*Nelson.*)

*6. 1818.—JOHN GIFFORD DIED,

A literary character of considerable eminence and great attainments. He was the author of a Life of PITT, as well as of many other works of celebrity, and was for many years editor of the Anti-Jacobin Review.

7.—PERPETUA.

Perpetua, a noble lady of Carthage, only 22 years of age, suffered martyrdom in 203, by order of Minutius Firmianus, under the persecution of the Emperor Severus. In the amphitheatre, Perpetua was exposed to the attacks of a wild cow, and, after being much gored by this animal, she languished for some time under the wounds given her by a young and unskilful gladiator.

*10. 1774.—SIR W. BROWNE DIED, ÆT. 82,

A physician of the last century, and a man of a most singular and whimsical cast of mind. His will is not the least remarkable of his multifarious compositions, and may be said to be written in Greek, Latin, and English.

12.—SAINT GREGORY.

Saint Gregory, surnamed the Great, was born about the year 540. Gadianus, his father, enjoyed the dignity of a senator, and was very wealthy. Our saint, in his youth, applied himself to the study of grammar, rhetoric, and philosophy; and afterwards to the civil law, and the canons of the church, in which he was well skilled. He was consecrated Pope about the year 590, and died in 604. Before his advancement to the see, Gregory projected the conversion of the English nation, but did not accomplish his wishes until he had assumed the papal chair.

17.—SAINT PATRICK.

The tutelar saint of Ireland was born in the year 371, in a village called *Bonaven Taberniæ*, probably Kilpatrick, in Scotland, between Dunbriton and Glasgow. He died at the good old age of 123, and was buried at Down, in Ulster. —See T. T. for 1815, p. 80, our last volume, p. 55, and Jocelyn's Life and Miracles of St. Patrick.

Through Erin's Isle,
To sport awhile,
As Love and Valour wandered,
With Wit, the sprite,
Whose quiver bright
A thousand arrows squandered;
Where'er they pass,
A triple grass
Shoots up, with dew-drops streaming,
As softly green
As emeralds seen
Through purest crystal gleaming!

Oh the Shamrock, the green, immortal Shamrock!
Chosen leaf
Of Bard and Chief,
Old Erin's native Shamrock!

Says Valour, 'See,
They spring for me,
Those leafy gems of morning!'
Says Love, 'No, no,
For *me* they grow,
My fragrant path adorning!'—
But Wit perceives
The triple leaves,
And cries, 'Oh! do not sever
A type, that blends
Three godlike friends,
Love, Valour, Wit, for ever!'

Oh, the Shamrock, the green, immortal Shamrock!
Chosen leaf
Of Bard and Chief,
Old Erin's native Shamrock!

Irish Melodies.

*17. 1815.—JOHN HEY, D.D. DIED,

For some years Norrisian Professor of Divinity in the University of Cambridge. His 'Theological Lectures,' in 4 volumes, 8vo, are a most valuable body of divinity. He published also some single sermons, and a volume of 'Discourses on the Malevolent Sentiments.' At the age of eighty, when he found himself unable any longer to discharge his pastoral duties, he resigned his preferment—a rare example of conscientious disinterestedness.

18.—EDWARD, KING OF THE WEST SAXONS.

He was stabbed in the back by order of his mother-in-law, Elfrida, at Corfe-castle, in Dorsetshire. The youth and innocence of this prince (says Hume), with his tragical death, begat such compassion among the people, that they believed miracles to be wrought at his tomb; and they gave him the appellation of Martyr, though his murder had no connexion with any religious principle or opinion. Elfrida built monasteries, and performed many penances, in order to atone for her guilt; but could never, by all her hypocrisy or remorse, recover the good opinion of the public, though so easily deluded in those ignorant ages.

21.—MIDLENT SUNDAY.

The middle or fourth Sunday in Lent was formerly called the Sunday of the Five Loaves, the Sunday of Bread, and the Sunday of Refreshment, in allusion to the gospel appointed for this day. It was also named *Rose Sunday*, from the Pope's carrying a *golden rose* in his hand, which he exhibited to the people in the streets as he went to celebrate the eucharist, and at his return. *Mothering Sunday* is another name attached to this day, from the practice, in Roman Catholic times, of people visiting their *mother church* on Midlent Sunday. Hence, perhaps, the custom now existing in some parts of England, of children visiting their parents, and presenting them with money, trinkets, or some other trifle. Furmety is commonly a rural repast on this day. It is made of whole grains of wheat first parboiled, and then put into and boiled in milk, sweetened and seasoned with spices.

21.—SAINT BENEDICT.

Benedict, or *Bennet*, was born at Norcia in Italy, about the year 480, and of an honourable family. Being sent by his parents to Rome to complete his studies, he became disgusted with

the licentiousness of the Roman youth, and retired to the mountain of Subiaco, about forty miles from the city. Bennet was now only fifteen, and lived for three years in a cave, Romanus, a monk, giving him provisions; these were let down by a rope, with a bell affixed, to give notice to the holy recluse. Bennet founded the monastery of Cassino in 529: it was built on the brow of a very high mountain, on the top of which there was an old temple of Apollo, surrounded with a grove. The Benedictine order of monks, first instituted by our saint, was, in the ninth century, at its height of glory.

25.—ANNUNCIATION OF THE BLESSED VIRGIN MARY, *or Lady Day.*

This day celebrates the angel's message to the Virgin Mary, respecting our Blessed Lord. She was, probably, an only child, and but fifteen years of age when espoused to Joseph. She died A.D. 48, being about sixty years old.

*26. 1726.—SIR JOHN VANBRUGH DIED,

Well known as an architect and as a dramatic writer. In the former art, the princely palace of the Marlborough family at Blenheim, a national monument of great military services and of public gratitude, has immortalized his name. In the latter, he is a noted instance of wit united with profligacy. His 'Provoked Husband,' however, written with an intention to atone for the loose tendency of his previous works, but left unfinished, and completed by Cibber, is one of the most interesting, amusing, and instructive comedies on the English stage.

*27. 1699.—DR. STILLINGFLEET DIED, ÆT. 64,

Author of *Origines Sacræ*, and other learned works, in 6 vols. folio. He was a man of profound learning, an able writer, and a sound divine.

28.—FIFTH SUNDAY IN LENT.

Dominica in Passione, or Passion Sunday, was

the name given to this day in missals; as the church now began to advert to the sufferings of Christ. In the north, it is called *Carling* Sunday, and grey peas, first steeped a night in water, and fried with butter, form the usual repast.

*28. 1818.—PRESIDENT PETION DIED.

From the year 1806, Petion divided the territory of Hayti, in Saint Domingo, with King Christophe. He was much and sincerely lamented by the mass of the people, whom he governed with great talents and exemplary propriety.

*29. 1711.—BISHOP KEN DIED,

A man of the most amiable manners, extensive charity, and exemplary piety. He attended the last hours of Charles II, but was prevented from exercising his official duties by the Popish priests who surrounded the dying monarch. He wrote the Evening Hymn.

*31. 1662.—DR. JOHN DONNE DIED,

Dean of St. Paul's, who was a good scholar, a popular satirist, and the wittiest of our English poets. He entered the church at the desire of King James, but was not distinguished as a divine.

Astronomical Occurrences

In MARCH 1819.

THE Sun enters Aries at 34 m. past 10 in the morning of the 21st of this month, and he rises and sets during the same period as in the following

TABLE.

The Sun's Rising and Setting for every fifth Day.

March	1st,	Sun	rises	36	m.	after	6.	Sets	24	m.	past	5
	6th,	-	-	25	-	-	6	-	35	-	-	5
	11th,	-	-	15	-	-	6	-	45	-	-	5
	16th,	-	-	6	-	-	6	-	54	-	-	5
	21st,	-	-	56	-	-	5	-	4	-	-	6
	26th,	-	-	46	-	-	5	-	14	-	-	6
	31st,	-	-	36	-	-	5	-	24	-	-	6

Equation of Time.

The numbers in the following table being added to the time as indicated by a good sun-dial, will give the time that ought to be pointed out by a well regulated clock at the same instant.

TABLE.

		m.	s.
Monday, March	1st, to the time by the dial *add*	12	46
Saturday,	6th,	11	42
Thursday,	11th,	10	26
Tuesday,	16th,	9	2
Sunday,	21st,	7	33
Friday,	26th,	6	1
Wednesday,	31st,	4	29

Phases of the Moon.

First Quarter,	3d day, at	31	m. after	8	evening.
Full Moon,	11th,	2		11	
Last Quarter,	19th,	41		4	morning.
New Moon,	25th,	24		11	evening.

Moon's Passage over the Meridian.

The Moon may be seen on the first meridian at the following convenient times for observation during this month, if the weather prove favourable, viz.

March	3d, at	40	m. after	5 in the evening.
	4th,	31		6
	5th,	23		7
	6th,	15		8
	7th,	6		9
	8th,	53		9
	9th,	38		10
	17th,	2		4 in the morning.
	18th,	59		4
	19th,	2		6
	20th,	5		7

Phase of Venus.

March 1st { Enlightened part - - - - - - 5·571971 digits.
{ Dark part - - - - - - - 6·428029 - - -

Eclipses of Jupiter's Satellites.

It is a remarkable circumstance, that notwith-

standing there are no less than *twenty-seven* immersions of Jupiter's first and second satellites this month, there will not be any of these visible at the Royal Observatory; and therefore we have omitted their insertion in this place.

Other Phenomena.

Mercury will be in his superior conjunction at 2 in the morning of the 18th of this month. Venus will attain her greatest elongation on the 7th. Saturn will be in conjunction at ½ past 7 in the morning of the 12th. The Georgium Sidus will be in quadrature at ¾ past 6 in the evening of the 15th, and stationary on the 30th. Mercury and Saturn will be in conjunction with each other at 4 m. after 8 in the morning of the 15th, when Saturn will be 15′ south of Mercury. The Moon will also be in conjunction with β in Taurus, at 48 m. after 12 on the 4th; with Pollux, at 40 m. past 1 in the morning of the 7th; with Spica in Virgo, at 2 m. after 8 in the morning of the 14th; with Antares, at 28 m. past 5 in the evening of the 17th; and with Mercury, at 29 m. past 7 in the evening of the 25th.

On TIME, *and its* APPLICATION.

As TIME and its *Occurrences* constitute the subjects of our labours, it was thought proper that these should commence with some observations relative to duration, for which we must refer the reader to the beginning of the first volume of Time's Telescope. As our youthful readers were not then sufficiently acquainted with the scientific principles upon which the measure of time, its divisions and applications depend, these remarks were necessarily such as to present only a very limited and popular view of the subject. But as the 'flux of time' has now enabled us to explain and illustrate these principles, we shall embrace the opportunity afforded by ano-

ther renewal of our annual labours, to present a fuller developement of this interesting topic. The nature of this perpetual current, however, that is of time itself, we shall leave to those who are more deeply skilled in the abstruse subtilties of metaphysical investigations, and confine ourselves chiefly to illustrations of its varied relations to the inquiries of man, and its applications to the practical purposes of human life.

There is, perhaps, no idea with which the mind is more familiar than that of time, and scarcely any thing which it is more difficult to define. Its intimate connection, however, with our very existence has always rendered a right understanding of this subject of great importance; and hence the interest it has so constantly excited among philosophers of all ages. The following selection will show with what success their attempts at a scientific definition have been attended. On this subject, St. Augustine said, that if not asked what time was, he knew; but if requested to define it, he did not know. Mr. Leibnitz defined time to be 'an order of successions, as space is an order of coexistences.' Hooke, as we have already stated, denominates time 'the flux of that instant in which the heavenly bodies began their motions.' Some modern speculators in metaphysical subtilties deny its existence altogether, and affirm that time is only a particular modification of eternity; which has no distinct or conceivable existence independent of the subject of which it is an attribute or property. So that, in order to gain a clear conception of the quality, we must first comprehend the subject to which it belongs; or, in plain terms, the finite must comprehend the infinite.

Dr. Young, in his Night Thoughts, has some curious poetical ideas on this subject. He calls time heaven's stranger, and represents its birth as

coincident with the creation of the world. Thus, in one place, he says,

> That memorable hour of wondrous birth,
> When the dread Sire, on emanation bent,
> And big with nature, rising in his might,
> Called forth creation, (for then time was born)
> By godhead streaming through a thousand worlds,

In another place, the same author mysteriously says,

> From old eternity's mysterious orb
> Was time cut off, and cast beneath the skies;
> The skies, which watch him in his new abode,
> Measuring his motions by revolving spheres;
> That horologe machinery divine.
> Hours, days, and months, and years, his children, play
> Like numerous wings around him, as he flies;
> Or rather, as unequal plumes, they shape
> His ample pinions, swift as darted flame,
> To gain his goal, to reach his ancient rest,
> And join anew eternity his sire.

These things have not been stated for the sake of the information they afford relative to the nature of time, abstractedly considered; but merely as specimens of the insuperable difficulties which obstruct the progress of the human mind when it attempts to pass the bounds which Infinite Wisdom appears to have set to its powers, and to consider *what* things are in themselves, instead of being satisfied with contemplating them in the *relation* they bear to one another, and to the other phenomena of nature. Maclaurin, whose mind was at once refined, penetrating, and comprehensive, when treating on this subject, does not attempt to define time as it is in itself, but only to illustrate our conceptions of it. 'From the succession of our own ideas (he observes), and from the successive variations of external objects in the course of nature, we easily acquire the ideas of duration and time, and of their measures. We conceive true or absolute time to

flow uniformly in an unchangeable course, which alone serves to measure with accuracy the change of all other things. For, unless we correct the vulgar measures of time, which are gross and inaccurate, by proper equations, the conclusions are always found to be incorrect and erroneous. Time may be conceived to be divided into successive parts, that may be less and less without end, though, with respect to any one particular being, there may be a least sensible time, as well as a *minimum sensibile* in other magnitudes. But however various the flux of time may appear to different intellectual beings, it cannot be thought to depend upon the idea of any created being whatever.'

Our ideas relative to the measure of time, therefore, include those of motion; and when a body describes equal spaces with a uniform velocity, we readily conceive that the times of their description are equal to each other, or that an equal interval of duration elapses between the commencement and termination of each motion. This may be familiarly illustrated by conceiving the minute hand of a watch to pass with a uniform motion over the whole circumference of the dial plate; then, all the divisions on that plate being supposed to be equal to each other, the time employed by the hand in passing over each of them must be the same, and each complete revolution of the hand will also be performed in the same time. Now, as the stars are fixed bodies at an immense distance from the Earth, and the diurnal rotation of the Earth is a uniform motion, this illustration may be readily transferred from the watch to the heavens; for, if we suppose an imaginary line to extend from any point on the Earth's surface to a star situated in the vertical plane passing through that point and the pole of the world, the termination of this line

would describe a circle in the heavens, with a uniform motion occasioned by the diurnal revolution of the Earth; and consequently not only every equal part of this circle would be described in an equal time, but each consecutive revolution would also be completed in precisely the same period of duration. This uniform revolution of the Earth on its axis, which causes any star always to return to the plane of the same meridian, after equal and successive intervals, therefore, becomes a proper measure of time, and one which the laws of nature appear to have rendered immutable. Each of these revolutions is denominated a *sidereal day;* and the measure of duration as referred to this standard is called *sidereal time.*

The Sun, however, is the most conspicuous object in the heavens, and therefore the best adapted for the division of time into periods for the common and practical purposes of life; and hence his successive returns to the same meridian, though after unequal intervals of duration, have generally been adopted. Duration, as thus measured by the apparent motion of the Sun, is denominated *apparent* or *solar time,* and each interval between two consecutive returns of the Sun to the same meridian constitutes a *solar day,* which is divided into 24 hours.

But as the Earth has an annual motion in its orbit as well as a diurnal rotation about its axis, it advances through a certain part of its orbit during each of its diurnal rotations; it must therefore have actually performed more than one complete revolution on its axis, before the Sun appears again on the same meridian; for the diurnal revolution of the Earth is evidently completed, when the plane of the terrestrial meridian becomes again parallel to its former position. If the Earth had not any motion in its orbit, the

time that elapsed between the Sun leaving any meridian, and arriving at that meridian again, would always be equal to the time in which it performed one complete revolution on its axis. But as the Earth moves nearly a degree in its orbit while it performs one diurnal revolution, the length of one of these revolutions must always be less than 24 hours, or the time which elapses between the arrival of the Sun at the meridian in two successive days. Instead of the Earth's motion in its orbit, if the Sun be supposed to move in an opposite direction, the effect will be the same. For when the Sun is in the meridian of any place on one day, and that place is carried round to the same position the next day, the Sun will have moved from his former situation; so that the place on the Earth must move through an additional arc before the Sun will again be in the meridian, and consequently it will have performed more than a complete revolution. The time which is occupied in describing this additional arc will evidently be the same part of 24 hours, as the arc is of a whole revolution of the Sun round the Earth, or of 360°. Now the Sun in one day moves through an arc equal to 59′ 8″·3; therefore we have 360° : 59′ 8″·3 :: 24 h. : 3 m. 56s·6. Hence 24 h. — 3 m. 56s·6 = 23 h. 56 m. 3s·4, the real time in which the Earth performs a revolution about its axis. As the stars do not change their places like the Sun, they appear to describe circles in the heavens, or to revolve about the Earth in 23 h. 56 m. 3s·4; so that this is the length of the *sidereal* day, and 24 h. that of the *solar* day. Consequently, in 365 days, the Earth will perform just 366 complete revolutions about its axis.

[To be continued.]

The Naturalist's Diary

For MARCH 1819.

The showers were short, the weather mild,
The morning fresh, the evening smiled;
The fields and gardens were beset
With primrose, crocus, violet:
Thus all looked gay and full of cheer
To welcome the new-liveried year[1].

SUCH is Sir Henry Wotton's description of *Spring*, which will generally apply to the month of March, in forward seasons. 'And I do easily believe,' says old Izaac Walton, 'that peace and patience, and a calm content, did ever dwell in the cheerful heart of Sir Henry Wotton; because I know, that when he was beyond 70 years of age, he made this description of a part of the present pleasure that possessed him, as he sat quietly in a summer's evening on a bank fishing.' The superabundant moisture of the earth is now dried up, and the process of vegetation is gradually brought on: those trees which, in the last month, were budding, now begin to put forth their leaves; and the various appearances of nature announce the approach of SPRING.[2] The latest springs, however, are always the most favourable, because, as the young buds do not appear so soon, they are not liable to be cut off by chilling blasts.

The melody of birds now gradually swells upon the ear. The throstle (*turdus musicus*), second only to the nightingale in song, charms us with the sweetness and variety of its lays. The linnet and the goldfinch join the general concert in this month, and the golden-crowned wren (*motacilla regulus*) begins its song. Rooks build and repair their nests. Rooks, crows, and pigeons, it has been

[1] See the remainder of the poem in Walton's Angler, p. 122.

[2] There is a beautiful 'Elegy on the Approach of Spring,' in T. T. for 1817, p. 85.

proved, are by no means so detrimental to the farmer as is generally imagined, though many of them still commit great havoc among these birds, and use every means in their power to frighten them away.—(See T. T. for 1816, pp. 86, 87.)

Among the numerous singing birds which delight us with their notes in the spring, the *lark* must not be forgotten. The melody of this little creature continues during the whole of summer. It is chiefly, however, in the morning and evening that its strains are heard; and as it chaunts its mellow notes on the wing, it is the peculiar favourite of every person who has taste to relish the beauties of nature at the most tranquil seasons of the day, particularly at dawn.—See some interesting particulars of this bird in T.T. for 1817, p. 76.

The CAPTIVE LARK.

One dawning day, a farmer passed
Where feathery snares were set
When, lo! a lark, with piercing cries,
Laid struggling in the net.

'Oh! spare,' he cried, 'my forfeit life;
And blessings on your store!
'Twould kill my harmless babes and wife,
To see my face no more.

'I hurt no creature; this the whole
Of birds will vouch for me:
Nor have I thy possessions stole;
Let innocence go free.

'One grain, indeed, this hapless morn
I took, 'twas all I did;
To die for one poor grain of corn,
Justice will sure forbid!'

Meantime his mate, in search of food,
Their craving brood to rear,
Came picking by the fatal net
Which held her husband dear.

With mournful and incessant suit
Did she for mercy call;
'Oh, save my husband!' was her prayer,
'Or take my life withal!

'Of him bereft, who shall me aid
To rear our tender young!'
'Twas all she could, here utterance failed,
Her heart with anguish wrung.

A red-breast, from a neighbouring tree,
Surveyed their hopeless state—
'Cease, cease your piteous plaints,' said he,
'Nor think to shun your fate.

'Poor lark! be sure thy doom's decreed,
No eloquence will do;
For know, the wretch, to whom you plead,
Is judge and jury too!'

Yet grief had moved the farmer's breast,
Which, glorying to forgive,
Determined death should not divide
Those truth had formed to live.

With ready hand he loosed the string,
The captive soared on high;
Quickly his mate, with eager wing,
Rejoined him in the sky.

The red-breast, seeing mercy shown,
Enraptured took his flight;
Nor did the farmer's feeling heart
Experience less delight.

In this month, trout begin to rise; blood-worms appear in the water; black ants (*formica nigra*) are observed; the blackbird and the turkey (*meleagris gallopavo*) lay; and house pigeons sit. The greenfinch (*loxia chloris*) sings; the bat (*vespertilio*) is seen flitting about, and the viper uncoils itself from its winter sleep. The wheatear (*sylvia œnanthe*), or English ortolan, again pays its annual visit, leaving England in September. They are found in great numbers about East Bourne, in Sussex, more than eighteen hundred dozen being annually taken in this neighbourhood. They are usually sold at sixpence a dozen.—See T.T. for 1816, p. 88.

Those birds which have passed the winter in England now take their departure for more northerly regions. The fieldfares (*turdus pilaris*) travel

to Russia, Sweden, and Norway, and even as far as Siberia. They do not arrive in France till December, when they assemble in large flocks of two or three thousand. The red-wing *(turdus iliacus)*, which frequents the same places, eats the same food, and is very similar in manners to the fieldfare, also takes leave of this country for the season. Soon after, the woodcock *(scolopax rusticola)* wings its aërial voyage to the countries bordering on the Baltic. Some other birds, as the crane and stork, formerly natives of this island, have quitted it entirely, since our cultivation and population have so rapidly increased.

Frogs, enlivened by the warmth of spring, rise from the bottom of ponds and ditches, where they have lain torpid during the winter.—See our last volume, p. 69.

The facetious Peter Pindar has written a quaint, but amusing, little ode on the frog; and as it inculcates a useful moral lesson, we shall introduce it to the notice of our readers:—

A thousand frogs, upon a summer's day,
Were sporting 'midst the sunny ray,
In a large pool reflecting ev'ry face;
They showed their gold-laced clothes with pride,
In harmless sallies frequent vied,
And gambolled through the water with a grace.

It happened that a band of boys,
Observant of their harmless joys,
Thoughtless, resolved to spoil their happy sport;
One frenzy seized both great and small,
On the poor frogs the rogues began to fall,
Meaning to splash them, not to do them hurt.

As Milton quaintly sings, 'the stones 'gan pour,'
Indeed an Otaheite show'r!
The consequence was dreadful, * *
One's eye was beat out of his head—
This limped away, that lay for dead—
* * *

Among the smitten, it was found
Their beauteous queen received a wound;

The blow gave ev'ry heart a sigh,
And drew a tear from ev'ry eye:
At length king croak got up, and thus begun—
'My lads, you think this very pretty fun!
'Your pebbles round us fly as thick as hops,—
* * *
To you, I guess that these are pleasant stones;
And so they might be to us frogs,
* * *
But they're so hard, they break our bones.'

The smelt *(salmo eperlanus)* begins to ascend rivers to spawn, when they are taken in great abundance.

On the 20th, the *vernal* equinox takes place. All Nature feels her renovating sway, and seems to rejoice at the retreat of winter. The sallow *(salix)* now enlivens the hedges; the aspen *(populus tremula)*, and the alder *(alnus betula)*, have their flowers full blown; the laurustinus *(viburnum tinus)* and the bay *(laurus nobilis)* begin to open their leaves. The equinoctial gales are usually most felt, both by sea and land, about this time.

Our gardens begin now to assume somewhat of a cheerful appearance. Crocuses, exhibiting a rich mixture of yellow and purple, ornament the borders; mezereon is in all its beauty; the little flowers 'with silver crest and golden eye,' daisies, are scattered over dry pastures; and the pilewort *(ranunculus ficaria)* is seen on the moist banks of ditches. The primrose too *(primula veris)* peeps from beneath the hedge.

The leaves of honeysuckles are now nearly expanded: in our gardens, the buds of the cherry tree *(prunus cerasus)*, the peach *(amygdalus persica)*, the nectarine, the apricot, and the almond *(prunus armeniaca)*, are fully opened in this month. The buds of the hawthorn *(cratægus oxycantha)* and of the larch tree *(pinus larix)* begin to open; and the tansy *(tanacetum vulgare)* emerges out of the ground; ivy-berries are ripe;

the coltsfoot *(tussilago)*, the cotton-grass *(eriophorum vaginatum)*, wood spurge *(euphorbia amygdaloides)*, butcher's broom *(ruscus aculeatus)*, the daffodil *(pseudonarcissus)* in moist thickets, the rush *(juncus pilosus)*, and the spurge laurel *(daphne laureola)*, found in woods, are now in bloom. The common whitlow grass *(draba verna)* on old walls; the yellow Alpine whitlow grass *(draba aizoides)* on maritime rocks; and the mountain pepper-wort *(lepidium petræum)* among limestone rocks, flower in March.

The sweet violet *(viola odorata)* sheds its delicious perfumes in this month.

To the VIOLET.

Sweet flower! of the tranquil glade,
Emblem of virtue, in the shade;
Rearing thy head, to brave the storm,
That wou'd thy beauty soon deform—
Of all the flowers the seasons bring,
Of all that decorate the Spring,
To me, while doomed to wander here,
The fragrant Violet shall be dear.

How like the Violet in th' wild,
In *Claremont's Groves* the *Princess* smiled,
Till GOD (who gave those blossoms birth)
So fair a *Flower* removed from earth:
Nor left, alas! one *Bud* behind
To tranquilize a nation's mind,
Save that sweet *Bud* which strews the way,
Blest Hope[1], to an *eternal day*. STUDENS.

The gannets or Solandgeese *(pelecanus bassanus)* resort in March to the Hebrides, and other rocky isles of North Britain, to make their nests and lay their eggs.

Much amusement may be derived in this month, as well as in the last, from watching the progress of worms, insects, &c. from torpidity to life, particularly on the edges or banks of ponds.—See T.T. for 1817, p. 53.

[1] Spes tutissima cœlis.

Towards the close of the month, bees *(apis mellifica)* venture out of their hives. For a full account of this interesting insect we refer the reader to our four first volumes.

Thou cheerful Bee! come, freely come,
And travel round my woodbine bow'r,
Delight me with thy wandering hum,
And rouse me from my musing hour:
Oh! try no more yon tedious fields,
Come taste the sweets my garden yields;
The treasure of each blooming mine,
The bud—the blossom—all are thine!

And careless of this noontide heat,
I'll follow as thy ramble guides,
To watch thee, pause and chafe thy feet,
And sweep them o'er thy downy sides;
Then in a flower's bell nestling lie,
And all thy busiest ardour ply;
Then o'er the stem, though fair it grow,
With touch rejecting, glance and go.

O Nature kind! O labourer wise!
That roam'st along the summer ray,
Glean'st ev'ry bliss thy life supplies,
And meet'st prepared thy wintry day;
Go—envied go—with crowded gates,
The hive thy rich return awaits;
Bear home thy store in triumph gay,
And shame each idler on thy way! SMYTH.

In the latter end of March, chickens run about; a brimstone-coloured butterfly *(papilio rhamni)* appears; black beetles fly about in the evening; and bats issue from their places of concealment. Roach and dace float near the surface of the water, and sport about in pursuit of insects. Daffodils are in flower; peas appear above ground; the sea-kale *(crambe maritima)*, a vegetable somewhat similar to, but more delicate than, asparagus, now begins to sprout. The male blossoms of the yew-tree expand and discharge their farina. Sparrows are busily employed in forming their nests. Young lambs are yeaned this month.

If the season be dry, the *stone-picker* is sent

into the fields to gather stones for the road, by which she accumulates heaps for the inspection of the mineralogist. Mankind and the elements are, indeed, constantly at work for him. When laid upon the road, they are more amply spread out to his view, and the carriage passing over breaks and exhibits the interiors. Every fresh ploughing turns up fresh treasures, every frost crumbles the adhering dirt, and every shower helps to wash them clean before him; the torrent rolls them from the banks into the brook, the drought lays them bare, and the sun, in his daily course, from various points, shines upon the crystals and discovers them in sparkling beauty. The digging of a well, and the opening of a gravel pit, a chalk pit, or a stone quarry, are all interesting events to a mineralogist.—See *Outlines* of *Geology* and *Mineralogy*, prefixed to T.T. for 1818.

In our last year's Diary for March (p. 73), we gave a poetical picture of the farm-yard in this month, together with some observations on the wonderful instinct of the hen in constructing her nest and rearing her young[1]; in unison with this subject, is Bloomfield's description of the *gander:*

He comes, the pest and terror of the yard,
His full-fledged progeny's imperious guard;
The GANDER;—spiteful, insolent, and bold,
At the colt's footlock takes his daring hold;
There, serpent-like, escapes a dreadful blow,
And straight attacks a poor defenceless cow:
Each booby goose th' unworthy strife enjoys,
And hails his prowess with redoubled noise.
Then back he stalks, of self-importance full,
Seizes the shaggy forehead of the bull,
Till whirled aloft he falls; a timely check,
Enough to dislocate his worthless neck;

[1] To p. 74, line 13, of our last volume, add the following:—'Not exactly so, for she will sit to hatch ducks' eggs for four weeks, and turkeys' eggs for the same time. Some hens, also, when disappointed of hatching one set of eggs, from their being addled, will sit upon a second set if they can get at them.

For, lo! of old, he boasts an honoured wound;
Behold that broken wing that trails the ground!
Thus fools and bravoes kindred pranks pursue;
As savage quite, and oft as fatal too.
Happy the man that foils an envious elf,
Using the darts of spleen to serve himself!

In this month the farmer dresses and rolls his meadows; spreads ant-hills; plants quicksets, osiers, &c.; sows flax seed, artificial grasses, beans and peas, broom and whin seeds, and grass seeds among wheat. About the 23d, he ploughs for and sows oats, and hemp and flax. A dry season is very important to the farmer, that he may get the seed easly into the ground.

Your barly land labor with plough and plogh-share,
The roots of your fruit-trees to couer haue care;
Ply planting and graffing, sow beans, oates and peason,
Set sit-ruls and sage, for now is the season.
Eate good meates and cleanse thee,
Let bloud, if neede vrge thee.

The vaunteless stagge ashamed to see
His antlers brave now prest ta wracke,
From cragges and mountes to couch doth flee
To mourn the horror of his lacke.

DECRIPTION OF FRUIT TREES.

[Continued from p. 64.]

Fig Tree (*Ficus carica*).—This tree seldom exceeds eight feet in height. The trunk is about the size of a human arm. The branches are smooth, with oblong white dots. There are many different sorts of this fruit tree: the principal are worthy of notice. The largest is the brown or chestnut coloured Ischia fig: this sort is purple within. It very often bursts open when ripe, and has a sweet and highly-flavoured pulp. When planted against hot walls, it will ripen two plentiful crops of fruit every year.—The black Genoa fig has a skin of a very dark purple colour, and is covered with a purple farina like that observed upon some

sorts of plums. This farina, if suffered to touch the lips, produces a very unpleasant stinging kind of sensation. The inside of the fruit is of a bright red colour, and the flesh is very highly flavoured.—The large white Genoa fig. This is a globular-formed fruit, with a thin yellowish coloured skin, and is red within when fully ripe. It is a good sort, but the trees are generally unproductive.—The Maltese fig is of a pale brown colour, both outside and in, and is very sweet and well flavoured. If it were permitted to hang upon the trees till shrivelled by the sun, it would become a fine sweetmeat. There are two kinds of Naples figs, the flesh of both of which is well flavoured. The yellow Ischia fig is a large fruit of a pyramidal form. The skin is yellow when ripe, and the flesh purple and well flavoured, but the trees do not produce much fruit in our climate, though the branches grow very luxuriantly. The Madonna, which is also called the Brunswick and Hanover fig, is a long pyramidal large sized fruit. The skin is brown, and the flesh of a lighter colour, but the flavour not excellent. The common blue or purple fig is a very productive sort, and ripens its fruit in August. The fig tree has the same name, with little variation, in all the languages of Europe. The first that were introduced into England are still remaining in the garden of Lambeth Palace. They are of the white Marseilles kind, and bear delicious fruit. They cover a surface of forty feet in breadth. Tradition says they were planted by Cardinal Pole; and the account is very probable; for it is generally allowed that fig trees were brought into England in the reign of Henry the Eighth, and it seems likely that the cardinal, who had long resided in Italy, should delight in cultivating those fruits to which he had been there ac-

customed. The Indian fig tree, or, as the English generally term it, the Banyan tree, is a remarkable species of the same genus as the European fig tree. The Portuguese call it the *rooting tree*, because, by letting a kind of gummy string fall from its branches, they take root and gradually enclose a vast circuit. This of course forms a delightful alcove or bower, in the midst of which stands the main trunk; and hence old Gerarde, gardener to Lord Burleigh, in the time of Queen Elizabeth, appropriately called it the *arched* Indian fig tree. To this Milton alludes in the following beautiful description:—

> Branching so broad and long, that in the ground
> The bending twigs take root; and daughters grow
> About the mother tree; a pillared shade,
> High over-arched with echoing walks between.
> There oft the Indian herdsman, shunning heat,
> Shelters in cool; and tends his pasturing herds
> At leafy loop-holes cut through thickest shade.

The wood of the common fig tree being porous and spongy, is of little use; but that of the Egyptian or Pharaoh's fig tree was used, on account of its extreme durability, for the coffins in which the mummies were interred. The stem of this sort is often fifty feet thick in its native country. The fruit is good even in this country, where it is called the mulberry fig, and the tree has obtained the name of the sycamore. The sorts first described will ripen their fruits on standards when in a warm situation, but the other kinds require to be placed against sunny walls, or their fruit will not ripen. They will produce most fruit upon a strong loamy soil, rather than on dry ground. The cultivation of the fig in the islands of the Grecian Archipelago is so very curious, that it would not be right to pass it by unnoticed. The wild tree bears three different kinds of fruit: the first are called *Sornites*, the second *Cratirites*,

and the third *Orni*. The first appear in August; they contain little worms, hatched from eggs deposited by flies. In October and November these little worms become flies. These flies pierce the second sort of figs, which continue till the month of May following, and furnish a lodgement for the second class of flies. In May the third sort of figs appears, and when they are grown to a certain size, and begin to open at the eye, they are pierced by the flies which have been produced in the second sort of figs. As soon as the worms bred in the third sort are transformed into flies, which happens in the month of May or July, the Grecian peasants gather them, and bring them into contact with the garden fig trees. The success of this tedious operation all depends upon this circumstance, and hence they inspect both their wild and their garden fig trees every morning, to examine the eye of the fig, by which they judge when the flies are about to issue from the wild figs, and when they may be applied so as to pierce the garden figs. The insects are then deposited on such trees as are fit to receive them, and enter the fruit at the eye, where they lay their eggs; the worms produced by which cause the garden figs to attain their proper size and maturity. The consequence of all this trouble is, that garden fig trees, which would scarcely yield twenty-five pounds of ripe figs, are brought to produce more than ten times that quantity. This process is called *Caprification*. As to the manner in which the puncture of the flies contributes to enlarge and mature the fruit; it may possibly be by lacerating the vessels and extravasating the nutritious juice when they deposit their eggs: with the egg they may also introduce some liquor, which gently ferments with the juice of the fig, and thereby softens its pulp. Even the Provence and Paris figs ripen much

sooner by wounding their buds with a straw or feather dipped in olive oil; and plums and also pears are found to ripen soonest when wounded by insects; and it is remarkable, that, in the last named fruits, that part of the pulp which borders on the wound made by the insect is always the most delicious.

APRIL.

APRIL is derived from *Aprilis*, of *aperio*, I open, because the earth, in this month, begins to open her bosom for the production of vegetables. The Saxons called this month *oster-monat*, from the goddess Goster, or because the winds were found to blow generally from the east in this month.

Remarkable Days

In APRIL 1819.

1.—ALL FOOLS' DAY.

ON this day every body strives to make as many fools as he can: the wit chiefly consists in sending persons on what are called sleeveless errands, for the *history of Eve's mother*, for *pigeon's milk*, *stirrup oil*, and similar ridiculous absurdities.

The making of April fools, after all the conjectures which have been formed touching its origin, is probably borrowed by us from the French, who call them April Fish *(Poissons d'Avril)*, i. e. simpletons, or, in other words, silly mackerel, who suffer themselves to be caught in this month. But as, with us, April is not the season of that fish, we have very properly substituted the word 'FOOLS.'

On the custom of keeping *fools* at court, and the

dress of the domestic fool in Shakspeare's time, consult T.T. for 1815, p. 118, et seq.

*3. A. D. 33.—CRUCIFIXION OF OUR SAVIOUR.

3.—RICHARD, *Bishop*.

Richard, surnamed *de Wiche*, from a place in Worcestershire where he was born, was educated at the Universities of Oxford and Paris. He afterwards travelled to Bononia, where he studied the canon law for seven years. On his return home he was nominated to the see of Chichester by the chapter; but his appointment being opposed by the king, Richard appealed to Rome, and had his election confirmed by the pope, who consecrated him also at Lyons in the year 1245. He was as remarkable for his learning and diligence in preaching, as he was for integrity. Richard was canonized by Pope Urban.

4.—PALM SUNDAY.

In the missals, this day is denominated *Dominica in ramis Palmarum*, or Palm Sunday, and was so called from the palm branches and green boughs formerly distributed on that day, in commemoration of our Lord's riding to Jerusalem. Sprigs of *box-wood* are still used as a substitute for *palms* in Roman Catholic countries.—See also T.T. for 1815, p. 84.

4.—SAINT AMBROSE.

Our saint was born about the year 340, and was educated in his father's palace, who was Prætorian Præfect of Gaul. He ruled over the see of Milan with great piety and vigilance for more than twenty years; during which time, he gave all his money to pious uses, and settled the reversion of his estate upon the church. He converted the celebrated St. Augustine to the faith, and, at his baptism, composed that divine hymn, so well known in the church by the name of *Te Deum*. He died aged fifty-seven, A.D. 396.

*5. A.D. 33.—OUR LORD'S RESURRECTION.

Burst are the gates of death; blunted the sting
Of sin: Messiah mounts th' exalted car
Of triumph. As Elijah, wrapt of old
To heaven, victorious o'er the murky grave,
He rises to the realms of endless day. ZOUCH.

*6. 1804.—REV. W. GILPIN DIED,

So well known for his elegant writings on the Picturesque, his 'Lives of the Reformers,' 'Sermons to Country Congregations,' and various other works. Mr. Gilpin drew with the pencil of an artist, and he made his *amusement* subservient to the best interests of mankind. With the produce of his picturesque works he established two schools in his parish, one for boys and another for girls; and from the sale of his original drawings and manuscripts a sufficient sum was raised permanently to endow them. An excellent little tract of his, called 'An Explanation of the Duties of Religion,' was drawn up for the use of these schools.

8.—MAUNDY THURSDAY.

This day is called, in Latin, *dies Mandati*, the day of the command, being the day on which our Lord washed the feet of his disciples, as recorded in the second lesson. This practice was long kept up in the monasteries. After the ceremony, liberal donations were made to the poor, of clothing and of silver money, and refreshment was given them to mitigate the severity of the fast. On the 15th April, 1731 (Maundy Thursday), the *Archbishop of York washed the feet* of a certain number of poor persons. James II was the last king who performed this in person. A relic of this custom is still preserved in the donations dispensed at St. James's on this day; the ceremonies of which, as also those at Rome and Moscow on

this day, are described at length in T.T. for 1815, p. 86.

An account of the 'washing of feet' on this day, on a recent occasion, at Vienna, is given by Dr. Bright in his entertaining travels:—'On the Thursday of this week, which was the 24th of March, a singular religious ceremony was celebrated by the court. It is known in German Catholic countries by the name of the *Fusswaschung*, or the 'washing of the feet.' The large saloon, in which public court entertainments are given, was fitted up for the purpose; elevated benches and galleries were constructed round the room for the reception of the court and strangers; and in the area, upon two platforms, tables were spread, at one of which sat twelve men, and at the other twelve women. They had been selected from the oldest and most deserving paupers, and were suitably clothed in black, with handkerchiefs and square collars of white muslin, and girdles round their waists.

'The emperor and empress, with the archdukes and archduchesses, Leopoldine and Clementine, and their suites, having all previously attended mass in the royal chapel, entered and approached the table to the sound of solemn music. The Hungarian guard followed in their most splendid uniform, with their leopard-skin jackets falling from their shoulders, and bearing trays of different meats, which the emperor, empress, archdukes, and attendants, placed on the table, in three successive courses, before the poor men and women, who tasted a little, drank each a glass of wine, and answered a few questions put to them by their sovereigns. The tables were then removed, and the empress and her daughters the archduchesses, dressed in black, with pages bearing their trains, approached. Silver bowls were placed beneath the bare feet of the aged women. The grand chamberlain, in a humble posture, poured water

upon the feet of each in succession, from a golden urn, and the empress wiped them with a fine napkin she held in her hand. The emperor performed the same ceremony on the feet of the men, and the rite concluded amidst the sounds of sacred music.'

9.—GOOD FRIDAY.

This day commemorates the sufferings of Christ, as a propitiation for our sins. Holy Friday, or the Friday in Holy Week, was its more antient and general appellation; the name Good Friday is peculiar to the English church. It was observed as a day of extraordinary devotion. Buns, with crosses upon them, are usually eaten in London and some other places on this day, at breakfast. —For an account of ceremonies in various places, consult T.T. for 1815, p. 88, and T.T. for 1817, pp. 89-91.

10.—EASTER EVE.

Particular mortifications were enjoined to the earliest Christians on this day. From the third century, the fast was indispensable and rigid, being protracted always to midnight, sometimes to the cock-crowing, and sometimes to the dawn of Easter-day; and the whole of the day and night was employed in religious affairs.

11.—EASTER DAY, *or* EASTER SUNDAY.

Much difference of opinion prevailed in the Eastern and Western churches respecting the precise time of observing Easter; till, in 325, the Council of Nice declared that the feast should be kept by all churches on the same day. Easter is styled by the fathers the highest of all festivals, the feast of feasts, the queen of festivals, and *Dominica Gaudii*, the joyous Sunday. Masters granted freedom to their slaves at this season, and valuable presents were made to the poor.

The august ceremonies performed at Rome on this day, Whitsunday, and other festivals, are no-

ticed in T.T. for 1815, p. 165; the magnificent pageant at Moscow, on account of the Resurrection, is also described at p. 90 of the same volume. For a variety of old English customs observed at Easter, we refer to T.T. for 1814, pp. 82-84.

*11. 1817.—REV. W. BELOE DIED, ÆT. 60,

The elegant and learned author of the 'Translation of Herodotus,' 'Anecdotes of Literature and Scarce Books,' 'The Sexagenarian,' &c. &c. Thus he had but just entitled himself to the appellation which in the last mentioned work he had assumed, when he was suddenly called from an existence of much bodily pain and suffering. 'In this work he had supposed that after his death a friend had discovered a number of scattered materials, from which its volumes were to be formed, and had so supplied the connecting links as to make the history complete. In this manner he had proceeded, sustaining the character of himself and his friend, within a few pages of the conclusion of his work, and had even corrected the press down to the last sheet. Little, perhaps, did he think how prophetic was his plan, and that on his own death-bed he should in reality entrust to a friend that office, which in fiction he had supposed to have been committed to his care! No man, perhaps, of his age, possessed larger or more varied resources of curious and entertaining scholarship than Mr. Beloe. His conversation was easy, elegant, and communicative; and no scholar could leave his company without an addition to his stock of knowledge. As a friend, he was respected and beloved: his last hours were those of a good and pious man; and happy will he be, who, after a life so actively and so usefully employed, shall repose upon a death-bed so calm, and so Christian, as that of the SEXAGENARIAN.'

12, 13.—EASTER MONDAY AND TUESDAY.

Every day in this week was formerly observed

as a religious festival, sermons being preached and the sacrament administered. In many places, servants were permitted to rest from their usual employments, that they might constantly attend public worship. During fifteen days, of which the paschal solemnity consisted, the courts of justice were shut, and all public games, shows, and amusements, were prohibited: it is unnecessary to observe that this practice has long ceased, and that the Easter week is usually devoted to relaxation and amusement.

*12. 1767.—DR. EDWARD YOUNG DIED.

'There are fine things in his Night Thoughts, though you cannot find twenty lines together without extravagance.'—(*Johnson's Table-Talk.*)

*14. 1817.—ADMIRAL DUCKWORTH DIED.

Like Hood, Nelson, and Bridport, Sir John Duckworth claimed a clergyman of the church of England for his father, being one of the five sons of the late Rev. Henry Duckworth, rector of Fulmer, in Buckinghamshire. By mere professional merit he rose to the most exalted posts in the naval service, distinguished himself in several brilliant engagements, and died admiral of the white, and knight-grand-cross of the bath, in his 70th year.

18.—LOW SUNDAY.

It was a custom among the primitive Christians, on the first Sunday after Easter-day, to repeat some part of the solemnity of that grand festival; whence this Sunday took the name of *Low Sunday*, being celebrated as a feast, though in a lower degree.

19.—SAINT ALPHEGE.

A native of England, Alphege was first Abbot of Bath, then Bishop of Winchester, in the year 984, and, twelve years afterwards, Archbishop of Canterbury. In the year 1012, the Danes being disappointed of some tribute money which they claimed as due to them, they entered Canterbury,

and burnt both the city and church, and the greater part of the inhabitants were put to the sword. After seven months' miserable imprisonment, the good archbishop was stoned to death at Greenwich.

23.—SAINT GEORGE.

Saint George is the patron Saint of England; for which the following reason is assigned: When Robert, Duke of Normandy, the son of William the Conqueror, was fighting against the Turks, and laying siege to the famous city of Antioch, which was expected to be relieved by the Saracens, St. George appeared with an innumerable army coming down from the hills all clad in white, with a red cross on his banner, to reinforce the Christians; this so terrified the infidels, that they fled, and left the Christians in possession of the town. Under the name and ensign of St. George, our victorious Edward III, in 1344, instituted the most noble Order of the Garter. St. George is usually painted on horseback, and tilting at a dragon under his feet, as represented on the reverse of the new *Sovereigns* and *Crowns* now in circulation. For an account of the Order, see our last volume, p. 82.

25.—SAINT MARK.

St. Mark's Gospel was written in the year 63. The order of knights of St. Mark at Venice, under the protection of this evangelist, was instituted in the year 737, the reigning doge being always grand master: their motto was, '*Pax tibi, Marce, Evangelista Meus.*' The superstitious fears with which Saint Mark's Eve is annually regarded by thousands in this country, are probably known to the majority of our readers. Utterly senseless and absurd as they must appear to all whose advantages of birth and education have placed them above the dominion of weak and vulgar fancies, we should not now recur to them, except with the view of pointing out Mr. Plumptre's '*Sermon on Apparitions,*' as an admirable antidote

to this and every other species of delusion in regard to spectral appearances.

*26. 1726.—JEREMY COLLIER DIED,

The bold champion of piety and morality against the profligate wits of the day, Dryden, Vanbrugh, Congreve, and Wycherley. His 'View of the Profaneness and Immorality of the Stage,' as it aimed at the purification and not the total extinction of dramatic entertainments, had the desired effect; and, as the Rev. William Jones (of Nayland), in his 'Letters from a Tutor to his Pupils,' says, 'brought Dryden himself to repentance, and does indeed beggar every work upon the same argument: it is the triumph of wit over scurrility, of piety over profaneness, of learning over ignorance, and of christianity over atheism.'

*APRIL, 1818.—GENERAL PLATOFF DIED,

The gallant Hetman of the Cossacks, who, when Bonaparte was ravaging his country, proved his honest detestation of the invader, by the promise of his daughter in marriage to the man who should bring Napoleon a prisoner to his camp! He died at a very advanced age, at Novotscherkask.

Astronomical Occurrences

In APRIL 1819.

THE Sun enters Taurus at 3 m. after 11 at night on the 20th of this month, and he will be eclipsed on the 23d; but the eclipse will not be visible in this country. This luminary will also rise and set as specified in the following

TABLE

Of the Sun's Rising and Setting for every fifth Day.

April 1,	Sun rises	35	m.	after	5.	Sets	25	m.	after	6
6,	- - -	25	- -		5	-	35	- - -		6
11,	- - -	15	- -		5	-	45	- - -		6
16,	- - -	5	- -		5	-	55	- - -		6
21,	- - -	56	- -		4	-	4	- - -		7
26,	- - -	47	- -		4	-	13	- - -		7

Equation of Time.

The following quantities must be added to or subtracted from the time as shown by a good sun-dial, in order to obtain the time that should be shown at the same instant by a well regulated clock.

TABLE.		m.	s.
Thursday - April	1st, to the time by the dial *add*	4	10
Tuesday - - - - -	6th, - - - - - - - - - - - -	2	40
Sunday - - - - -	11th, - - - - - - - - - - - -	1	14
Friday - - - - -	16th, - - - - - - - - *subtract*	0	4
Wednesday - - -	21st, - - - - - - - - - - - -	1	14
Monday - - - - -	26th, - - - - - - - - - - - -	2	12

Phases of the Moon.

First Quarter	2d day, at	19	m. after	4	afternoon.
Full Moon -	10th, - - -	5	- -	1	- - -
Last Quarter	17th, - - -	47	- -	10	morning.
New Moon -	24th, - - -	48	- -	11	- - -

The Moon will also be eclipsed on the 10th of this month; but as the beginning of the eclipse is about a quarter past 11 in the morning, and the end at 57¼ m. past 2 in the afternoon, it will be altogether invisible in this country.

Moon's Passage over the first Meridian.

The Moon will pass the meridian of the Royal Observatory at Greenwich at the following convenient times for observation, provided there be a clear atmosphere, viz.

April 2d, at	14	m. after	6	in the	evening.
3d, -	5	- - -	7	- - - - -
4th, -	54	- - -	7	- - - - -
5th, -	40	- - -	8	- - - - -
6th, -	25	- - -	9	- - - - -
7th, -	8	- - -	10	- - - - -
8th, -	51	- - -	10	- - - - -
15th, -	3	- - -	4	in the	morning.
16th, -	6	- - -	5	- - - - -
17th, -	9	- - -	6	- - - - -

Phase of Venus.

April 1st	Enlightened part - - - - - - - - -	6·3297	digits.
	Dark part - - - - - - - - - -	5·6703	- - -

Eclipses of Jupiter's Satellites.

There are nearly as many eclipses of Jupiter's first and second satellites this month, as there was last, but none of them are visible at the Royal Observatory.

Form of Saturn's Ring.

April 1st	Transverse diameter - - - - - - - - -	1·000
	Conjugate diameter - - - - - - - - -	—0·035

By comparing this result with that for January, it will be perceived that the plane of the ring has passed through the Earth between these two epochs, as there is a change of sign from plus to minus; and consequently that ring was wholly invisible during a part of this interval. This happened at the end of February and the beginning of March, as may readily be verified by performing the calculation for that time, when it will be found that the conjugate diameter for the 1st of March was only— 0·001; and therefore much too small to be perceived, even by the best telescopes.

Other Phenomena.

Mercury will attain his greatest elongation on the 13th of this month, and he will be stationary on the 22d. Mars and Saturn will be in conjunction at 20 m. past 2 in the morning of the 26th, at which time Mars will be 45′ north of Saturn. The Moon will be in conjunction with the star Pollux at 44 m. past 9 in the morning of the 3d; with Spica, in Virgo, at 46 m. after 3 in the afternoon of the 10th; with Antares at 17 m. after midnight of the 13th; with Mercury at 3 m. past 11 in the morning of the 24th; with β in Taurus, at 41 m. after 5 in the morning of the 28th; and with γ in Gemini, at 33 m. past 2 in the afternoon of the 29th.

On TIME *and its* APPLICATION.

[Continued from p. 77.]

In addition to the divisions of time stated in the preceding part of this article, astronomers frequent-

ly refer to two others, respecting which, a brief explanation appears to be necessary. The two opposite points which constitute the intersections of the equator and ecliptic, are called the equinoctial points; and the two, where the ecliptic touches the tropics, the solstitial points: the time elapsed between two consecutive passages of the Sun through the same equinoctial or solstitial points, is called a *tropical* year, which the observations of astronomers have found to contain 365 d. 5 h. 48 m., and 45½ s. In a similar manner, the *sidereal* year is determined by the returning of the Sun to the same fixed star. If, for example, the Sun be observed to coincide with any star at a given time, the interval of duration which elapses before he returns again to the same star, constitutes the sidereal year; the length of which is 365 d. 6 h. 9 m., and 14½ s. The sidereal year is therefore 20 m. 29½ s. longer than the solar or tropical year, and 9 m. 14½ s. longer than the civil year, which is 365 d. 6 h. Hence the civil year is nearly a mean between the sidereal and tropical years.

But for astronomers, to whom uniformity of motion is indispensable to the simplicity and facility of their calculations, the use of apparent solar time, which answers all the purposes of civil life, is not practicable. They consequently make use of a third species of time, which is altogether of an artificial nature. For this purpose they suppose the Sun to move along the equator with a uniform motion, by which means he would describe equal arcs of that circle in equal times. This is the time that is shown by well regulated clocks and watches; and as they suppose the *mean* motion of the Sun to be adopted as the measure of this species of duration, it is denominated *mean time*. The origin of this species of time, as well as that of apparent solar time, is placed at the vernal equinox, so that, as they both commence at the same point, the variation between mean time,

and that actually shown by the real motion of the Earth on its axis and in its orbit, and which is indicated by a good sun-dial, is never very great; the latter oscillating about the former without ever departing much from it.

The difference between solar and mean time arises from several causes, but especially from *two*, which we hope the following explanation will render familiar to our youthful readers. These causes are the *unequal motion* of the Earth in its orbit, or, according to *appearances*, of the Sun in the ecliptic; and the *inclination* of the ecliptic to the equator.

As the Earth's axis is perpendicular to the plane of the equator, and the motion of the Earth on its axis uniform, equal portions of this circle would pass over the meridian in equal times. But as the ecliptic is inclined to the equator, this cannot be the case with respect to it. The daily motion of the Earth therefore carries unequal portions of the ecliptic over the same meridian in equal times, the difference being always proportional to the obliquity, which varies from 0 to nearly 23° 28′, and hence these differences are unequal to each other. This may be familiarly illustrated in the following manner.

'Suppose, for example, that the Sun and a star were to set out together from one of the equinoctial points, and to move continually through equal arcs in equal times, the star in the equator, and the Sun in the ecliptic; then it is evident that the star, moving in the equator, would always return to the meridian exactly at the end of every 24 hours, as measured by a well regulated clock, that keeps equal time; but the Sun, moving in the ecliptic, would come to the meridian sometimes sooner than the star, and sometimes later, according to their relative situations; and they would never be found upon that circle exactly together but on four days of the year; namely, on the 20th of March, when the Sun enters Aries; on the 21st of June, when he enters Cancer; on the

23d of September, when he enters Libra; and on the 21st of December, when he enters Capricorn.'

'This part of the equation of time may be made still more familiar by means of a globe; for if a small black patch be put upon every tenth or fifteenth degree, both of the equator and ecliptic, beginning at the point Aries, and the globe be turned round slowly to the westward, all the patches from Aries to Cancer, and from Libra to Capricorn, will come to the meridian sooner than their corresponding patches on the equator; and all those from Cancer to Libra, and from Capricorn to Aries, will come to the meridian later than their corresponding patches on the equator: while the patches at the beginning of Aries, Cancer, Libra, and Capricorn, being on or even with those of the equator, show that the Sun and star will either meet there, or are even with each other, and for that reason must come to the meridian at the same time.'

The following table exhibits the relation of solar and mean time at certain intervals, as resulting from this cause, and they relate to the period when the sun-dial is faster than the clock; that is, the difference of the arrival of the Sun and the star, as supposed above, at the same meridian, will be on

	m.	s.
March 21st, dial faster than clock	0	0
April 5th,	4	46
April 21st,	8	23
May 6th,	9	53
May 21st,	8	45
June 6th,	5	8
June 21st,	0	0

The other principal cause of the difference between solar and mean time, as already stated, is the unequal motion of the Earth in its orbit, arising from the unequal action of the Sun upon it at different times of the year. The apparent motion of the Sun is slowest in summer, when he is farthest from the Earth, and

swiftest in winter, when he is nearest to it. This is shown by his being longer by about eight days on the northern than in the southern half of the ecliptic; from which circumstance alone the motion of the Sun could not be a true measure of time. This motion sometimes exceeds a degree in 24 h., and at others is less than that quantity; and consequently when it is slowest, any particular meridian will come sooner to the Sun than when his motion is quickest; so that, if there were no other cause of difference, the days cannot be equal to each other.

If two bodies, therefore, were to move in the plane of the ecliptic, so as to go exactly round the Earth in a year; the one describing an equal arc every 24 h., and the other describing sometimes a greater and at others a less arc in the same period, gaining in one part of the year what it lost in another; one of these bodies would obviously come sooner or later to the meridian than the other, according to their respective situations; and when they were both in conjunction, they would come to the meridian at the same instant.

To illustrate this conception more fully, let it be supposed that the Sun and a star commence their annual motions together from that part of the ecliptic in which the Sun is at the greatest distance from the Earth, the former moving with a variable and the latter with a constant velocity, but both completing the whole orbit in exactly the same time, that is, in the space of a year. As the Sun is supposed to be in apogee when the motion commences, his motion is the slowest; and as that of the star is always uniform, it is evident that the star will describe a larger arc in the same time than the Sun will; and consequently, as the Earth turns on its axis from west to east, it will be noon by the Sun sooner than by the star. But as the Sun moves from his apogee where his distance is greatest, to his perigee where it is

least, the velocity of his motion will continually increase till he arrives at his least distance from the Earth, when it will have attained its maximum. But notwithstanding this increase, the star gains so much upon the Sun in the early part of their progress, that the increased velocity of the latter will not be able to compensate for this loss till the star arrives at the perigee, or till each of them has gone just half round the ecliptic; and as they will then be in conjunction, they will be upon the same meridian together; and consequently it will be noon by both of them at the same instant. From this point, where the velocity of the Sun is greatest, it will carry him before the star, in consequence of which, the plane of the same meridian will arrive at the star sooner than it will reach the Sun; and therefore it will be noon by the star before it is noon by the Sun. The motion of the Sun diminishes, in this case, till he arrives again at his greatest distance from the Earth, at which time the two bodies will be once more in conjunction, and it will then be noon by both the Sun and star at the same time. From this it appears that the solar noon is always later than the mean noon, when the Sun is between his perigee and apogee; and before it, during his passage from his apogee to his perigee. So that solar and mean time, as affected by this cause only, would agree on two days in the year; but the difference, which results from the obliquity of the ecliptic only, vanishes four times in the course of the year, as already stated. It is not, however, on any of these days that the equation of time arising from both these causes combined becomes nothing, but at those epochs when the increase from the one just compensates for the diminution from the other.

That part of the equation of time arising from the unequal motion of the Earth in its orbit, during the part of his annual revolution when the dial is slower than the clock, is contained in the following table.

		m.	s.
March	21st, dial slower than clock	7	39
April -	5th, - - - - - - - - -	7	38
April -	21st, - - - - - - - - -	7	6
May -	6th, - - - - - - - - -	6	5
May -	21st, - - - - - - - - -	4	47
June -	6th, - - - - - - - - -	3	5
June -	22d, - - - - - - - - -	1	3
July -	1st, - - - - - - - - -	0	0

By a comparison of this and the preceding table, it appears that, from the obliquity of the ecliptic, the equation on the 21st of March is nothing, and from the inequality of the apparent solar motion, it is 7 m. 39 s. at the same time; the whole equation is therefore 7 m. 39 s. On the 5th of April, the equation is 4 m. 46 s., as resulting from the first cause, and 7 m. 38 s. from the second; and since the dial is faster than the clock in the one case, and slower in the other, the difference, 7 m. 38 s. — 4 m. 46 s. = 2 m. 52 s., is the whole equation resulting from a combination of both causes. By proceeding in this manner throughout the whole, viz. subtracting when the dial is slower than the clock, and adding when it is faster, we shall obtain the equation for any given time of the whole revolution. That which results from a comparison of the two preceding tables is as follows, embracing the whole equation from both these causes.

		m.	s.	
March	21st, - - - - - - -	7	39,	Dial slower.
April -	5th, - - - - - - -	2	52,	- - - - -
April -	21st, - - - - - - -	1	17,	Dial faster.
May -	6th, - - - - - - -	3	48,	- - - - -
May -	21st, - - - - - - -	3	58,	- - - - -
June -	6th, - - - - - - -	2	3,	- - - - -
June -	22d, - - - - - - -	1	3,	Dial slower.

In the calculation of these numbers, the small effects of nutation have not been taken into the account; but these are so small, as to make very little difference in the results.

The value of the equation of time is also readily

found from the difference of right ascension of the real Sun and of the fictitious one, which we have supposed to proceed along the equator with a uniform motion. The longitude of the mean Sun may be found by means of astronomical tables, and referred to the equator, and then it will be right ascension. And if the nutation of the Earth's axis be neglected, the true and mean poles will coincide, and the true right ascension of the Sun will be measured on the same equator as that of the mean Sun. These two right ascensions will, in general, differ from each other, since the right ascension of the real Sun increases unequally, while the increase in that of the supposed Sun is uniform. This difference reduced into time at the rate of 15 degrees to an hour, will give the time which the real Sun either follows or precedes the supposed one, at the moment for which the calculation is made.

The correctness of these remarks is easily shown, when the effect of nutation is not taken into the account. For, if the right ascension of the real Sun be denoted by A, that of the fictitious Sun, which is supposed to have a uniform and mean motion, by M, and the right ascension of the zenith by a; it is evident that $\frac{a-A}{15}$ will be the apparent time, and $\frac{a-M}{15}$ the mean time. The difference between mean and apparent time will therefore be

$$\frac{a-M}{15} - \frac{a-A}{15} = \frac{A-M}{15},$$

since a vanishes by subtraction, and there remains only the difference of the right ascensions of the two Suns. When the effect of nutation is taken into the account, it will introduce a slight modification into this result, but this will never amount to more than a few seconds.

[To be continued.]

The Naturalist's Diary

For APRIL 1819.

Again the wood, and long-withdrawing vale,
In many a tint of tender green are drest,
Where the young leaves, unfolding, scarce conceal
Beneath their early shade the half-formed nest
Of finch or woodlark; and the primrose pale,
And lavish cowslip, wildly scattered round,
Give their sweet spirits to the sighing gale. C. SMITH.

THIS pleasing season of the year invigorates Nature through her inmost recesses, and flings over every object an air of gaiety and cheerfulness. The weather is mild, with gentle showers, affording to vegetables an abundant supply of water, which is so indispensably necessary to their existence. This is the general character of April; yet we have sometimes very sharp frosts in this month, as well as in its successor, MAY.

Oft brushed from Russia's wilds, a cutting gale
Rises, and scatters from his humid wings
The clammy mildew, or, dry-blowing, breathes
Untimely *frost*, before whose baleful blast
The full-blown Spring through all her foliage shrinks
Joyless and dead. THOMSON.

The arrival of the swallow about the middle of the month announces the approach of summer. There are four species of the hirundines that visit England; they arrive in the following order:—(1.) The chimney swallow *(hirundo rustica)*, which builds its nest generally in chimneys, in the inside, within a few feet of the top, or under the eaves of houses. (2.) The house martin *(hirundo urbica)*, known by its white breast and black back, glossed with blue, visits us in great numbers. It builds under the eaves of houses, or close by the sides of the windows. (3.) The sand martin *(hirundo riparia)* is the smallest of our swallows, as well as the least numerous of them. It frequents the steep, sandy banks, in the neighbourhood of rivers;

in the sides of which it makes deep holes, and places the nest at the end. (4.) The swift *(hirundo apus)* is the largest species, measuring nearly eight inches in length. These birds build their nests in lofty steeples and high towers, and sometimes under the arches of bridges. For poetical illustrations, see our five former volumes.

Young moles are now to be found in the nests, and, therefore, this is a good time for destroying them. There are commonly four or five in a nest, and they are naked when first born. Weasels and stoats are great enemies to moles, and frequently get into their holes, kill the inhabitants, and take up their own abode there. Thus do the several sorts of vermin help to keep up a kind of balance of power among them.

The next bird which appears, after the swallow, is that sweet warbler, the *motacilla luscinia*, or nightingale. Although the nightingale is common in this country, it never visits the northern parts of our island, and is but seldom seen in the western counties of Devonshire and Cornwall, or in Wales; though it annually visits Sweden. It leaves us sometime in the month of August, and makes its regular return in the beginning of April. In England, nightingales frequent thick hedges and low coppices, and generally conceal themselves in the middle of some leafy bush. They commence their song in the evening, and continue it the whole night[1].

That beautiful little bird, the wryneck *(jynx torquilla)* makes its appearance about the middle of the month, preceding the *cuckoo* by a few days. The well-known cry of the *cuculus canorus* is heard soon after the wryneck, and ceases the latter end of June; its stay is short, the old cuckoos being said to quit

[1] For many interesting particulars of the nightingale, as well as numerous poetical illustrations, see T.T. for 1817, p. 110; for 1816, p. 117; for 1815, p. 139; and for 1814, p. 99.

this country the latter end of June. See more of the cuckoo in T.T. for 1817, p. 113.

The other summer-birds of passage which arrive this month, make their appearance in the following order: the ring-ousel *(turdus torquatus)*, the redstart *(motacilla phœnicurus)*, frequenting old walls and ruinous edifices; the yellow wren *(motacilla trochilus)*; the swift, already noticed; the whitethroat *(motacilla sylva)*; the grasshopper lark *(alauda trivialis)*, the smallest of the lark kind; and, lastly, the willow-wren, which frequents hedges and shrubberies, and feeds on insects, in search of which it is continually running up and down small branches of trees. The house-wren destroys many pernicious insects. The beauty, simplicity, and innocence of the winged tribes, attract particular regard and attention: we even converse with them, and address them in the language of benevolence.

Again the balmy zephyr blows,
Fresh verdure decks the groves;
Each bird with vernal rapture glows,
And tunes his notes to love.

Ye gentle warblers! hither fly,
And shun the noontide heat;
My shrubs a cooling shade supply,
My groves a safe retreat.

Here freely hop from spray to spray,
Or weave the mossy nest;
Here rove and sing the live-long day,
At night here sweetly rest.

Amidst this cool translucent rill
That trickles down the glade,
Here bathe your plumes—here drink your fill,
And revel in the shade.

No schoolboy rude to mischief prone
E'er shows his ruddy face,
Or twangs his bow or hurls a stone
In this sequestered place.

Hither the vocal *thrush* repairs,
Secure the *linnet* sings;
The *goldfinch* dreads no slimy snares
To clog her painted wings.

Sad *Philomel!* ah, quit thy haunt,
Yon distant woods among;
And round my friendly grotto chaunt
Thy sweetly plaintive song.

Let not the harmless *red-breast* fear,
Domestic bird! to come,
And seek a sure asylum here
With one that loves his home.

My trees for you, ye artless tribe,
Shall store of fruit preserve:
O let me thus your friendship bribe,
Come, feed without reserve!

For you these cherries I protect—
To you these plums belong:
Sweet is the fruit that you have peckt,
But sweeter far your song!

In a former volume (T.T. for 1816, p. 120) we have spoken at length on the nightingale and other birds of song, noticing the superiority of England in this respect over the continent of America. The observation is lately confirmed by Mr. Cobbett, in his 'Year's Residence in the United States of America,' in a passage in which the politician has almost forgotten himself into poetry:—'There are two things which I have not yet mentioned, and which are almost wholly wanting here, while they are so amply enjoyed in England,—the singing-birds and the flowers. Here are many birds in summer, and some of very beautiful plumage. There are some wild flowers, and some English flowers in the best gardens; but, generally speaking, they are birds without song, and flowers without smell. The linnet (more than a thousand of which I have heard warbling upon one scrubbed oak on the sand hills in Surrey), the skylark, the goldfinch, the woodlark, the nightingale, the bullfinch, the blackbird, the thrush[1], and all the rest of the singing tribe, are wanting in these beautiful

[1] Mr. Cobbett has, however, omitted to notice the *mocking-thrush* (see T.T. for 1816, p. 120), as well as numberless beautiful shrubs, peculiar to some parts of the new continent.

woods and orchards of garlands. When these latter have dropped their bloom, all is gone in the flowery way. No shepherd's rose, no honeysuckle, none of that endless variety of beauties that decorate the hedges and the meadows in England. No daisies, no primroses, no cowslips, no blue-bells, no daffodils, which, as if it were not enough for them to charm the sight and the smell, must have names, too, to delight the ear. All these are wanting in America.'

A contemporary writer, comparing the songs of nature with those of the opera, beautifully observes:—'The opera-singer sings to please the audience, not herself, and does not always like to be encored in it; but the *thrush*, that awakes at daybreak with its song, does not sing, because it is paid to sing or to please others, or to be admired or criticised. It sings because it is happy: it pours the thrilling sounds from its throat, to relieve the overflowings of its own heart—the liquid notes come from and go to the heart, dropping balm into it, as the gushing spring revives the traveller's parched and fainting lips. That stream of joy comes pure and fresh to the longing sense, free from art and affectation; the same that rises over vernal groves, mingled with the breath of morning, and the perfumes of the wild hyacinth, that waits for no audience, that wants no rehearsing, that exhausts its raptures, and still

Hymns its good God, and carols sweet of love.'

The tenants of the air are, in this month, busily employed in forming their temporary habitations, and in rearing and maintaining their offspring.—See our last volume, p. 104-106 [1].

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[1] *On seeing a* Boy *with a* Bird's Nest.

Yon feathered pair, how blest are they!
Their snug retreat no fears molest,
Until the schoolboy strolls that way,
And fills with pain each parent's breast.

About the middle of this month, the bittern *(ardea stellaris)* makes a hollow *booming* noise during the night in the breeding season, from its swampy retreats. Towards the end of the month, the blackcap *(motacilla atricapilla)*, called, in Norfolk, the mock-nightingale, begins its song.

Plovers' eggs now come into season, and are exhibited in small baskets, laid in moss, in the shops of fishmongers and poulterers.

The progress of vegetation is general and rapid in this month. The blossoms of trees present to the eye a most agreeable spectacle, particularly in those counties which abound with orchards. The black-thorn *(prunus spinosa)* is the first that puts forth its flowers; a host of others follow, among which may be named the ash *(fraxinus excelsior)*, ground-ivy *(glecoma hederacea)*, the box-tree *(buxus sempervirens)*, the pear-tree *(pyrus communis)*, the apricot, the peach, nectarine, the wild and garden cherry, and the plum; gooseberry and currant trees; the hawthorn *(cratægus oxycantha)*, the apple tree *(pyrus malus sativus)*, and the sycamore *(acer pseudo-platanus)*.

With anxious look the nest he 'spies,
And from the bush the young he tears,
Though each fond parent's plaintive cries
Earnestly beg him to forbear.

Flying around his thoughtless head,
They follow him with mournful strain,
Pining for those they've hatched and fed;
But all their cries, alas! are vain.

Rejoicing o'er his callow prize—
The parent birds their loss deplore—
With hasty step from them he hies;
And they behold their young no more!

Unfeeling boy, whoe'er thou art,
In future from such deeds refrain;
Let pity dwell within thy heart,
And never give another pain.

On observing a FRUIT TREE *in* BLOOM.

Awake, thou sleeper, view the budding spray,
Its bloom unfolding to the light of day;
Delightful woody garland of the year.
Oh! cursive fancy, be by reason led—
Where are thy phantom hopes?—what, are they fled?
Ah! trembling passions, coolly bid me hear.

Here, nature cries, this must for ever be
Ere the ripe fruit makes known the doubtful tree:
Know, too, the bud of Grace must break with care,
That angels pure may see Faith's harmless bloom
Mature to fruit of duty on the tomb,
And thou in CHRIST triumphing o'er despair.

The elm (*ulmus campestris*), the beech (*fagus sylvatica*), and the larch (*pinus-larix rubra*), are now in *full leaf*.

Many and lovely are the flowers which are showered, in profusion, from the lap of April: among them may be named the jonquil, anemoné, ranunculus, polyanthus, and the crown-imperial. Other flowers which adorn our fields, at this time, are the checquered daffodil (*fritillaria meleagris*); the primrose; the cowslip (*primula veris*); the lady-smock (*cardamine pratensis*);[1] and the hare-bell (*hyacinthus non scriptus*). The yellow star of Bethlehem (*ornithogalum luteum*) in woods; the vernal squill (*scilla verna*) among maritime rocks; and the wood sorrel (*oxalis acetosella*), are now in full flower.

Various kinds of insects are now seen 'sporting in the sun-beams,' and living their 'little hour.' The jumping spider (*aranea scenica*) is seen on garden walls; and the webs of other species of spiders

[1] This is sometimes called *cuckoo-flower*. Shakspeare, in the song introduced into 'Love's Labour Lost,' notices the lady-smock, and the 'cuckoo bud of yellow hue,' which is probably the crowfoot or buttercup.

When daisies pied and violets blue,
And lady-smocks all silver white,
And cuckoo buds of yellow hue,
Do paint the meadows with delight.

are found on the bushes, palings, and outsides of houses. The *iulus terrestris* appears, and the death-watch (*termes pulsatorius*) beats early in the month. The wood-ant (*formica herculanea*) now begins to construct its large conical nest. The shell-snail comes out in troops; the stinging-fly (*conops calcitrans*) and the red-ant (*formica rubra*) appear. The mole cricket (*gryllus gryllotalpa*) is the most remarkable of the insect-tribe seen about this time. The black slug (*limax ater*) abounds at this season. The blue flesh-fly (*musca vomitoria*), and the dragon-fly (*libellula*) are frequently observed towards the end of the month. Little maggots, the first state of young ants, are now to be found in their nests. The great variegated *libellula* (*libellula varia* of Shaw), which appears, *principally*, towards the decline of summer, is an animal of singular beauty. The cabbage butterfly also (*papilio brassica*) now appears.

The following anonymous lines from the Northampton Mercury describe very prettily some of the appearances of nature in this month.

O charming Spring, with what delight I watch
Thy gradual progress! I've viewed with joy
The earliest *snowdrop* on the sunny bank,
And felt the odour of the ev'ning gale,
Whose sweetest fragrance the eye bewrayed
Where the first *vi'let* peeped. Thy temp'rate sun
Wakes nature to new life.—Now o'er the vale
Big with new life the industrious *bee*
Rifles the op'ning flow'r. The *insect* tribe
Sport in the ev'ning ray, not wearying now
The thoughtful man, as with the ceaseless sound
Of summer, myriads, o'er their parent stream,
Dark'ning the twilight sky; for these called forth
To earlier life, the first-born of the year,
Now but remind him, that the better time
Draws on. Well pleased he views each wintry trace
That still remains, and when he hears the wind
Shake the green budding boughs, or clatter harsh
The bright-leaved *ivy* to the trunk it clasps,
He thinks that soon the summer breeze shall sound
Refreshing in the waving foliage.

On the habits and food of *caterpillars* consult T.T. for 1816, p. 124, and T.T. for 1818, p. 119. The scenery of a *forest* at the approach of spring is beautifully described in our last volume, p. 107, in an extract from Mr. Gisborne.

River fish leave their winter retreats, and again become the prey of the angler.

For the various employments of the 'Fisher Boy' in this month, and some lines descriptive of river fish, see T.T. for 1817, p. 121.

The spring flight of pigeons *(columbæ)* appears in this month, or early in the next.

Dry weather is still acceptable to the farmer, who is employed in sowing various kinds of grain, and seeds for fodder, as buck-wheat, lucerne, saintfoin, clover, &c. The young corn and springing-grass, however, are materially benefited by occasional showers. The important task of *weeding* now begins with the farmer, and every thistle cut down, every plant of charlock pulled up, may be said to be not only an advantage to himself, but a national benefit.

—

Sowe barlie this season in land that is strong,
Your garden hearbes setting delaye not too long:
To sowe hempe und flaxe and other good seede,
As cucummers and melons, this month you had neede.
To hoalsome bathes vse thee,
Sweet hearbs there to chuse thee.

The lambe and kydde in Lenten time
Which vnreuleese slept of slaughtering knyfe,
To fleunysh Easter in his prime
To butcher's gripes now pawne their lyfe.

—

DESCRIPTION OF FRUIT TREES.

[Continued from p. 90.]

FILBERD TREE.—*See* HAZEL.

GOOSEBERRY TREE *(ribes grossulariæ)*.—The name of this fruit, which is so universal in England,

appears to have been derived from its having formerly been eaten as a sauce with young, or, as they are commonly called, *green* geese. The best judges do not think it to have been originally a native of this country. In its wild state, the gooseberry tree or bush is only a foot or two in height, with a straight stem, and wholly covered with yellowish stiff prickles. This diminutive plant has, therefore, been greatly improved by cultivation; for in our gardens, when full grown, it generally attains to four feet in height. The smoothness or hairiness of the fruit is purely accidental. It is by no means esteemed in the southern parts of Europe, though so universally eaten in Great Britain. It is almost unknown in the Spanish peninsula. Even in this country it was at first held in but slight estimation; but has been so assiduously cultivated and improved, that it is now become valuable, not only for tarts, pies, and sauces, both fresh and preserved in bottles, but as an early dessert fruit: it is, also, preserved in sugar for culinary purposes during the winter. The varieties best known at present are of the red kind, as the hairy and smooth; the deep red; the damson, or dark bluish red; the red raspberry; the early black red; and the champaigne. The green sorts are the hairy, the smooth, the Gascoigne, the raspberry. The yellow kind are the largest, and are called the great oval, the great amber, the hairy amber, the early amber, and the large tawny or great mogul. The whites, are the common white, the white veined, and the large crystal. Besides all these there is the rumbullion, the large ironmonger, the smooth ironmonger, the hairy globe, and an immense host of others that are annually raised from seeds. Some of these are of an enormous size, so that the boughs would not bear their disproportionate weight, unless effectually propped, which the gardener could not safely omit. In the neighbourhood of London, these bushes have often been seen covered with berries, each of which

weighed from fifteen pennyweights to an ounce; but it must be confessed that the smaller sorts are better tasted. Although these shrubs will thrive in almost any soil and situation, and are often planted under the shade of trees, the fruit is invariably best when they are planted apart from all kinds of trees, and upon a light loamy soil. Although all other poets have passed over this humble annual contributor to our tables, the present Laureate has condescended to notice it in the following appropriate stanzas:—

Gooseberry-Pie is best.
Full of the theme, O Muse, begin the song!
What though the sunbeams of the west
Mature within the turtle's breast
Blood glutinous and fat of verdant hue?
What though the deer bound sportively along
O'er springy turf, the park's elastic vest?
Give them their honours due,—
But Gooseberry-Pie is best.

* * *

Blow fair, blow fair, thou orient gale!
On the white bosom of the sail
Ye winds enamoured, lingering lie!
Ye waves of ocean, spare the bark!
Ye tempests of the sky!
From distant realms she comes to bring
The sugar for my pie.
For this on Gambia's arid side
The vulture's feet are scaled with blood,
And Beelzebub beholds with pride
His darling planter brood.

First in the spring thy leaves were seen,
Thou beauteous bush, so early green!
Soon ceased thy blossom's little life of love.
O safer than the Alcides-conquered tree
That grew the pride of that Hesperian grove,
No dragon does there need for thee
With quintessential sting to work alarms,
And guard thy fruit so fine,
Thou vegetable porcupine!
And didst thou scratch thy tender arms,
O Jane! that I should dine!

The flour, the sugar, and the fruit,
Commingled well, how well they suit,

And they were well bestowed.
O Jane, with truth I praise your pie,
And will not you in just reply
Praise my Pindaric ode?

HAZEL *(corylus avellana)*.—The common hazel grows in woods, copses, and hedges, and flowers in March or April. All the different species of the hazel are large, hardy, and deciduous shrubs; they have several varieties, valuable for their fruit, which, in a cultivated state, is known under the name of *Filberts*. These shrubs prosper in almost any soil or situation; and may be propagated either by layers, or by planting their nuts in February. Squirrels and mice are excessively fond of the nuts; goats and horses eat the leaves, but they are refused by sheep and hogs. When reared in coppices, the hazel produces abundance of underwood.

The wood of the hazel is employed for poles, hoops for barrels, spars, hurdles, handles for implements of husbandry, walking-sticks, fishing-rods, &c. Charcoal, made from the hazel, is highly esteemed by painters and engravers.

Mr. Park's rustic plant, entitled the 'Filberd Tree,' cannot fail of being acceptable to every lover of delicate sentiment and elegant poetry:—

I had a little comely cot,
As neat as cottage well could be;
And near it rose a garden-plot,
Where flourished one embowering tree—
Ah, 'twas a tree of trees to me!

To my neat cot it gave a name,
A Filberd was my favourite tree;
Who saw it, praised it into fame,
And ev'n my neighbours, envying me,
Confessed—it was a goodly tree.

Its graceful branches o'er my head
Waved wide an arched canopy;
And its broad leaves benignly spread
A fan of green embroidery,
That shaded all my family.

It was a screen from wind or sun,
A veil from curiosity;
And when its summer bloom was gone,
We still could feast, with social glee,
On its autumnal fruitery.

E'en winter oft has seen it gay,
With fretted frost-work spangled o'er;
While pendants drooped from every spray,
And crimson budlets told once more
That spring would all its charms restore!

But I have left that comely cot,
Where blossoms now my favourite tree;
And I possess an ampler spot,
Which boasts of more variety,
And more enraptures all but me;

For what I once have helped to rear,
Have treasured with a guardian eye,
To my weak heart must still be dear,
To my fond thought will oft be nigh—
Thee, Filberd, still for thee I sigh!

MAY.

MAY is so called from *Maia*, the mother of Mercury, to whom sacrifices were offered by the Romans on the first of this month; or, according to some, from respect to the senators and nobles of Rome, who were named *Majores*, as the following month was termed Junius, in honour of the youth of Rome. The Saxons called May *tri-milki*, because, in that month, they began to milk their kine three times in the day.

Remarkable Days

In MAY 1819.

1.—MAY-DAY.

In the north of England, May-day still retains some of its antient sports. The celebration of May-day was, moreover, among the number of triumphal shows exhibited by our ancestors in London and

its environs. It was not only a *civic* but a *royal* amusement; as the kings, queens, and their courtiers, as well as the citizens, went a Maying.

1.—SAINT PHILIP AND SAINT JAMES THE LESS.

Philip was born at Bethsaida, near the sea of Tiberias, the city of Andrew and Peter. He was one of the first disciples, and an apostle. James the Less, called also *James the Just*, and, by the apostle Paul, *James*, the Lord's brother, was the son of Joseph, afterwards husband to the Virgin Mary, as is probable by his first wife. The first of these martyrs was stoned to death, and the second, having been thrown from a high place, was killed by a fuller's staff.

3.—INVENTION OF THE CROSS.

The Romish church celebrates this day as a festival, to commemorate the *invention* or finding of a wooden *cross*, supposed to be the *true one*, by Helena, the mother of Constantine the Great.

6.—JOHN EVANGELIST, A. P. L.

John the Evangelist, so called from the Greek term Εὐάγγελος, the messenger of glad tidings, was a Galilean by birth, the son of Zebedee and Salome, the younger brother of James, but not of him that was surnamed the Just, and who was the brother of our Lord. His brother James and he were surnamed by Jesus, the *Sons of Thunder*, meaning the principal ministers of the gospel, and John was more endeared to him than any of his disciples. He was condemned to be thrown into a cask of burning oil, Ante Port. Lat., before the gate of Latina; hence the letters added to his name. He lived to the reign of Trajan, and died about ninety years of age.

16.—ROGATION SUNDAY.

This day takes its name from the Latin term *rogare*, to ask; because, on the three subsequent days, *supplications* were appointed by Mamertus, Bishop of Vienna, in the year 469, to be offered up with fasting

to God, to avert some particular calamities that threatened his diocess.

19.—SAINT DUNSTAN.

Dunstan was a native of Glastonbury, and nobly descended; Elphegus, Bishop of Winchester, and Athelm, Archbishop of Canterbury, being his uncles; he was also related to King Athelstan. He was a skilful painter, musician, and an excellent forger and refiner of metals: he manufactured crosses, vials, and sacred vestments; he also painted and copied good books.

Dunstan was promoted to the see of Worcester by King Edgar; he was afterwards Bishop of London, and Archbishop of Canterbury. He died in 988, in the 64th year of his age, and in the 27th of his archiepiscopal dignity. His miracles are too commonly known to be repeated.

19.—QUEEN CHARLOTTE BORN.

Her present Majesty (Princess Charlotte of Mecklenburgh Strelitz) was born on the 19th of May, 1744; but her birthday is celebrated on the 18th of January.

20.—ASCENSION DAY.

From the earliest times, this day was set apart to commemorate our Saviour's ascension into heaven: all processions on this, and the preceding rogation days, were abolished at the reformation. In London, on this day, the minister, accompanied by the churchwardens, and a number of boys, with wands, walk in procession, and *beat the bounds* of the parish. But this is not always practised, nor in every year. For an account of some curious ceremonies practised on this day in the south of France, see our last volume, p. 87.

26.—AUGUSTIN, or *Austin*.

This *English apostle*, as he is termed, was commissioned by Pope Gregory the Great to convert the Saxons. He was created archbishop of Canterbury

in 556, and died about the year 610.—See a fuller account of him in T.T. for 1815, p. 174.

27.—VENERABLE BEDE.

Bede was born at Yarrow in Northumberland, in 673. His grand work is the Ecclesiastical History of the Saxons. Bede has obtained the title of *Venerable*, for his profound learning and unaffected piety, and not on account of any celebrity for miraculous and angelic operations.

*28. 1808.—BISHOP HURD DIED, ÆT. 88.

As a writer, his taste, learning, and genius, have been universally acknowledged; and although a full acquiescence has not been given in all his opinions, he must be allowed to be everywhere shrewd, ingenious, and original. Even in his sermons and charges, while he is sound in the doctrines of the church, his arguments and elucidations have many features of novelty, and are conveyed in that simple, yet elegant style, which renders them easily intelligible to common capacities. His private character was in all respects amiable. With his friends and connexions he obtained the best eulogium, their constant and warm attachment; and with the world in general a kind of veneration, which could neither be acquired nor preserved, but by the exercise of great virtues.

29.—KING CHARLES II RESTORED.

On the 8th of May, 1660, Charles II was *proclaimed* in London and Westminster, and afterwards throughout his dominions, with great joy and universal acclamations. In some parts of England it is customary for the common people to wear oak leaves, covered with leaf-gold, in their hats, in commemoration of the concealment of Charles II in an oak tree, after the battle of Worcester. An account of the king's escape to France, extracted from his *own Narrative*, will be found in T.T. for 1815, p. 176.

30.—WHIT-SUNDAY.

On Whit-Sunday, or *White-Sunday*, the *catechumens*, who were then baptized, as well as those who had been baptized before at Easter, appeared, in the antient church, in *white garments*. The Greeks, for the same reason, call it *Bright Sunday;* on account of the number of bright white garments which were then worn. The name of this Sunday, in the old Latin church, was *Dominica in Albis*, as was the Sunday next after Easter, on the same occasion. On this day the Holy Ghost descended upon the apostles and other Christians, in the visible appearance of fiery tongues. The celebration of divine service in St. Peter's church at Rome, on Whitsunday, is described in T.T. for 1815, p. 165.

31.—WHIT-MONDAY.

This day and Whit-Tuesday are observed as festivals, for the same reason as Monday and Tuesday in Easter. Their religious character, however, is almost obsolete, and they are now kept as holidays, in which the lower classes still pursue their favourite diversions. For an account of the Eton *Montem*, see T.T. for 1815, p. 168. The Whitsun Ales and other customs formerly observed at this season, are noticed in T.T. for 1814, pp. 119-120.

Astronomical Occurrences

In MAY 1819.

THE Sun enters Gemini at 25 m. after 11 in the evening of this month, and he will rise and set as in the following table during the same period.

TABLE

Of the Sun's Rising and Setting for every fifth Day.

May 1st,	Sun rises	38 m.	after	4.	Sets	22 m.	past	7
6th,	- - -	29	- -	4	-	31	- -	7
11th,	- - -	22	- -	4	-	38	- -	7
16th,	- - -	13	- -	4	-	47	- -	7
21st,	- - -	7	- -	4	-	53	- -	7
26th,	- - -	1	- -	4	-	59	- -	7
31st,	- - -	52	- -	3	-	8	- -	8

Equation of Time.

When it is wished to regulate a clock by means of a good sun-dial, the numbers in the following table must be subtracted from the time as indicated by the dial, and the remainder will be the time which should be shown by the clock at the same instant the dial was observed.

TABLE.

		m. s.
Saturday,	May 1st, from the time by the dial *subtract*	2 58
Thursday,	6th,	3 32
Tuesday,	11th,	3 51
Sunday,	16th,	3 57
Friday,	21st,	3 47
Wednesday,	26th,	3 24
Monday,	31st,	2 48

Phases of the Moon.

First Quarter,	2d day,	at 13 m.	past 11	morning.
Full Moon,	9th,	6	past	midnight.
Last Quarter,	16th,	17	after 4	afternoon.
New Moon,	24th,	2	after 1	morning.

Moon's Passage over the first Meridian.

The Moon will pass the meridian of the Royal Observatory at the following times during this month; which will be convenient for observation, if the weather be favourable; viz.

May	4th, at	7 m. after	8 in the evening.
	5th,	49	8
	6th,	32	9
	7th,	17	10
	8th,	5	11
	20th,	0	3 in the morning.
	21st,	5	4
	22d,	6	5

Phase of Venus.

May 1st { Illuminated part 7·70911 digits.
Dark part 4·29089

Eclipses of Jupiter's Satellites.

There will be only one eclipse of the first satellite

and one of the second visible at the Royal Observatory this month, which will happen as follows:

IMMERSIONS.

1st Satellite, 10th day, at 17 m. after 3 morning.
2d - - - 21st - - - - 4 - - - 3 - - -

Other Phenomena.

Mercury will be in his inferior opposition at 4 in the morning of the 3d of this month, stationary on the 17th, and attain his greatest elongation on the 31st. Jupiter will be in quadrature at 45 m. past 6 in the morning of the 7th. Mars and Venus will be in conjunction with each other at 8 m. after 8 in the morning of the 2d, when Mars will be 45′ south of Venus. The Moon will be in conjunction with α in Scorpio at 29 m. after 7 in the morning of the 11th; with Saturn at 46 m. after 2 in the morning of the 19th; with Venus at 15 m. after 8 in the morning of the 20th; with Mercury at 4 m. past 9 in the evening of the 20th; with β in Taurus at 20 m. after 1 in the afternoon of the 25th; and with Pollux at 27 m. past 1 in the morning of the 28th.

On TIME *and its* APPLICATION.

[Continued from p. 107.]

From the simple exposition of the subject already given, it may readily be conceived, that in virtue of the obliquity of the ecliptic combined with the inequality in the motion of the Sun, the equation of time becomes nothing four times in the course of the year; viz. once between the winter solstice and the perigee of the Sun, twice between the vernal equinox and the summer solstice, and again between the apogee and the autumnal equinox. These epochs, however, are not fixed, but vary with the position of the major axis of the solar orbit. They are at present about the 25th of December, the 16th of April, the 16th of June, and the 1st of September. The progressive change in the position of the major axis of

the apparent solar orbit ought also to produce a gradual and small corresponding variation in the absolute value of the equation of time. The causes, however, which make the equation of time vanish at certain intervals, ought still to produce their effect, notwithstanding the trifling variations which the effects of nutation may occasion; for as these variations never exceed a few seconds, they can only produce a small change in the four epochs in each year when the equation of time becomes nothing, but they can neither destroy it altogether, nor cause it to deviate from the limits above assigned to it.

If the inclination of the ecliptic to the plane of the equator were to become nothing, or the planes of the two circles to coincide with each other, that part of the equation of time which depends upon this inclination would also become nothing. Then the mean and real motions would only differ from each other by the effects produced by the inequalities of the latter motion, and which the French astronomers express by the equation of the centre. The real and the mean Sun would then meet only at the perigee and apogee, and apparent time would coincide with mean time only twice a year, when the Sun was in the line of his apsides.

From this explanation, it is easy to conceive that the instant of apparent noon, as marked by the shadow on the dial, will generally differ from that of mean noon. But as the equation of time is known for each day at this time, the direction and limit of the shadow may be marked on the dial at the instant of mean noon; and there will thus be obtained a series of points on both sides of the apparent meridian, which will mark the positions of the mean meridians at these successive instants. The curve described through all these points ought evidently to meet the meridian in four points, answering to the four times in the year in which the equation of time becomes nothing. This curve ought also to return in-

to itself, since the equation of time takes the same values after each revolution. It will not, however, be symmetrical, since the epochs at which the equation of time vanishes are not equal to each other. There is a meridian of this kind drawn by M. Bouvard, upon the Palace of Luxembourg, at Paris. The time which elapses between two consecutive passages of the Sun through the same equinoctial point, is very nearly equal to 365 d. 5 h. 48m. 51 s., and as in this time answers to one complete revolution of the sphere, or 360°, we have

$$\frac{360^\circ}{365\text{ d. }5\text{ h. }48\text{m. }51\text{ s.}} = 59'\ 8''{\cdot}33,$$

which is the arc daily described by the Sun in his orbit, supposing his motion to be uniform. His passage would therefore be daily retarded, with regard to sidereal time, by $\frac{1}{15}(59'\ 8''{\cdot}33) = 3'\ 36''\ 33'''32$ of sidereal time; and which is therefore the excess of the mean above the sidereal day. The duration of the mean hour is to the duration of the sidereal hour as 360° 59′ 8″·33 is to 360°, or as 24 h. 3m. 56ˢ·5554 is to 24 h.; and hence we have the equation

$$\frac{\text{the duration of the mean hour}}{\text{the duration of the sidereal hour}} =$$

$$\frac{360^\circ\ 59'\ 8''{\cdot}33}{360^\circ} = \frac{24^h\ 3^m\ 56^s{\cdot}5554}{24^h} =$$

$$\frac{86636{\cdot}5554}{86400} = 1{\cdot}00273791.$$

Thus, the duration of the mean hour is equal to 1·00273791 of the sidereal hour; and the duration of the sidereal hour is equal to

$$\frac{\text{the duration of the mean hour}}{1{\cdot}00273791} =$$

·99726967 of the mean hour.

If s be any duration whatever, expressed in side-

real time, and m the same duration in mean time, we have

$$m = \frac{s}{1{\cdot}00273791};$$

it will therefore be expressed by a less number in mean time than in sidereal time.

From the equation, $s = 1{\cdot}00273791$, we readily deduce $s - m = 1{\cdot}00273791m - m = 0{\cdot}00273791m$; so that when we know m, we have only to add $0{\cdot}00273791m$, in order to obtain s. Thus, if we suppose $m = 1$ h., we shall find $9^s{\cdot}8568$ to be added to it, in order to have $s = 1^h.\ 0^m.\ 9^s{\cdot}8568$.

Again, if we suppose $m = 7^h.\ 30^m.$, the quantity to be added to obtain s, will be $9^s{\cdot}8568 \times 7{\cdot}5 = 1^m.\ 13^s{\cdot}926$; and, consequently, $s = 7^h.\ 30^m. + 1^m.\ 13^s{\cdot}926 = 7^h.\ 31^m.\ 13^s{\cdot}926$.

The same result may be obtained from the previous equation, in which $s = 1{\cdot}00273791m$; for, multiplying m by this number, we shall have the value of s. Taking the last example, $1{\cdot}00273791 \times 7^h{\cdot}5 = 7^h{\cdot}520534325 = 7^h.\ 31^m.\ 13^s{\cdot}924$.

When s is given and m required, it is evident from the above equation that, if the value of s be multiplied by the reciprocal of the preceding number, or ·99727, we shall have the value of m. It is also obvious, that, if we subtract ·00273^s from the given time, we shall also obtain the value of m.

Thus, taking the above value of s, namely $7^h.\ 31^m.\ 13^s{\cdot}924$, as an example, we have $7^h{\cdot}521 \times {\cdot}99727 = 7^h.\ 30^m.$ Or, by the second method, we have $7^h{\cdot}521 \times {\cdot}00273 = {\cdot}021$ nearly; and $7{\cdot}521 - {\cdot}021 = 7^h.\ 30^m.$, as before.

One sidereal hour answers to 15° of motion of the celestial sphere. One mean hour answers to $15° + 2'\ 27''{\cdot}8526 = 15°\ 2'\ 27''{\cdot}8526$: and it is upon this principle that astronomers have calculated tables for converting mean time into degrees; according to which, $1^m.$ of mean time answers to $15'\ 2''{\cdot}4642$, and $1^s.$ of mean time corresponds to $15''{\cdot}04107$ of a

degree. The table thus formed is necessary to those astronomers who regulate their clocks by mean solar time, in order to find the horary angles of the stars, or the differences of mean right ascensions, $m = s(1 - \cdot00273791) + (0\cdot002738) - \&c. = s - \cdot0027344$.

Let $s = 1$ sidereal hour, $m = 1$ h. $- 9''\cdot8292$. From this formula the table for reducing sidereal time to mean time is calculated at the rate of $9^s\cdot8292$ per hour, or $3^m.\ 55^s\cdot901$ for 24 hours.—This table is necessary for astronomers who regulate their clocks by sidereal time, for when they have observed the time of any phenomena, it is only in this species of time that it is known. And in order to have it expressed in mean time, they calculate the mean place of the Sun referred to the apparent equinox. This mean longitude, converted into time at the rate of 1 h. to 15°, is the Sun's mean right ascension, or the sidereal time of the passage of the Sun's mean place over the meridian, or, in other words, the sidereal time at mean noon. This time subtracted from the time of the observation, gives an interval of sidereal time, which is then to be converted into mean time. The following example will illustrate this process.

Suppose, then, any observation to be made at $17^h.\ 9^m.\ 23^s\cdot5$ of sidereal time; and that the mean longitude of the Sun at mean noon was

			$5^s.\ 29^\circ\ 4'\ 7''\cdot0$
Equation of the equinoctial points			$+\ 13\cdot0$
Sun's mean right ascension	5	29	4 20
	$11^h.$	$56^m.$	$17^s.\ 20''$
Sidereal time at mean noon	11	56	17·33
Sidereal time of the observation	17	9	23·5
Interval of sidereal time	5	13	6·17
The table gives, to subtract, for $5^h.$			$-49\cdot15$
$13'$			$-\ 2\cdot13$
$6''$			$-\ 0\cdot02$
Interval of mean time			$5^h.\ 12^m.\ 14^s\cdot87$

This is the mean time elapsed since the passage of the mean Sun over the meridian, and is what is called the *mean time of the observation*. This time supposes the motion of the Sun on the equator to be uniform; and it is the passage of the point of the equator which corresponds to this uniform motion, which determines what is called *mean noon*, and the interval from this noon constitutes mean time, as the interval from apparent noon constitutes apparent time.

Apparent time is too unequal a measure for astronomers, though it may answer for civil purposes. Clocks can mark only mean or sidereal time as these alone are uniform; they can never indicate apparent time except by a particular construction, and then not with accuracy. Hence all astronomers regulate their clocks by sidereal time, when they have a fixed observatory, and by mean solar time in other cases.

Apparent time therefore serves only to find mean or sidereal time. If the transit of the Sun over the meridian be observed by means of a clock regulated to sidereal time, and the rate of which is known, we shall have the Sun's right ascension; but if the rate be not known, the time of the observation is to be compared with the Sun's right ascension, either as calculated or taken from an Ephemeris, and the difference is the correction of the clock. By calculating at the same time the equation of time or the mean right ascension of the Sun, we have the difference between the clock and mean time for the instant of apparent noon.

If the observation of the Sun's passage over the meridian be ascertained by means of a clock regulated to mean time, the time is to be compared with the Sun's mean right ascension in time, and the difference is the error of the clock at the instant of apparent noon; and if this observation be repeated for several successive days, the rate of the clock will be

found, and we shall be able to assign the time of any observation whatever.

If the Sun's zenith distance were observed, with this distance, the height of the pole and his declination, the apparent horary angle is calculated, any this, corrected by the equation of time, gives the mean time of the observation, and consequently the actual error of the clock. Several comparisons of this kind give the progress of this error, and consequently the rate of the clock. Mean time multiplied by 15 gives the mean horary angle, which added to the Sun's right ascension calculated for the same time, gives the right ascension of mid-heaven, or sidereal time. Hence it is obvious, that apparent time, or that which is shown by the apparent motion of the Sun in the heavens, serves astronomers only for calculating mean and sidereal time.—See *Delambre's Abrégé d'Astronomie*, Leçon XII.

[To be continued.]

The Naturalist's Diary

For MAY 1819.

Call the vales, and bid them hither cast
Their bells, and flowrets of a thousand hues.
Ye valleys low, where the mild whispers use
Of shades, and wanton winds, and gushing brooks;
On whose fresh lap the swart star sparely looks,
Throw hither all your quaint enamelled eyes,
That on the green turf suck the honied showers,
And purple all the ground with vernal flowers.

MILTON.

THIS is often the most delightful month of the whole year, and is remarkable for the profusion of verdure which it exhibits: nature's carpet is fresh laid, and nothing can be more grateful than to press its velvet surface. The scenery of a May morning is, not unfrequently, as beautiful as possibly can be conceived; a serene sky, a refreshing fragrance arising from the face of the earth, and the melody of

the feathered tribes, all combine to render it inexpressibly delightful, to exhilarate the spirits, and call forth a song of grateful adoration.

The latest species of the summer birds of passage arrive about the beginning of this month. Among these are the goatsucker, or fern-owl *(caprimulgus Europæus)*, the spotted fly-catcher *(muscicapa grisola)*, and the sedge-bird *(motacilla salicaria)*, called the English *mock-bird*.

In this and the following month the *dotterel* is in season, and is to be found on the heaths and moors of Lincolnshire, Derbyshire, and Cambridgeshire. The dotterel is a simple bird, and fond of imitation, and used formerly to be taken in nets by a person approaching them, and stretching out a leg or an arm, which, the bird seeing, made a similar motion with his leg or wing, which occupied its attention till the net was dropped over the whole covey.

There is a traditional story current in Cambridgeshire, that James the First was very fond of the sport of seeing dotterel taken; and, when at Newmarket, used to go upon the Gogmagog hills for that purpose, and was attended by a clergyman of one of the parishes bordering on them, who was very expert at making these motions; when the king was so pleased with him, that he said he would remember him, and promised him a living. The clergyman, however, after some time, thinking, like Young, that he had 'been so long remembered' that he was 'forgot,' went up to London, and attended at court. Finding himself, however, unnoticed amid the crowd of courtiers, he began to stretch first one arm, and then another, till at length he caught his majesty's eye, who exclaimed '*There's my dotterel parson;*' and, on learning what business had brought him thither, he gave him the long-promised living.

The insect tribes continue to add to their numbers; among these may be named several kinds of moths and butterflies *(papilio atalanta, cardamines,*

ægeria, &c.) The queen of Spain butterfly *(papilio lathonia)*, scarlet with black spots, with its under sides inlaid as it were with silver, among the few places where it is to be met with, is found in Gomingay-wood, in Cambridgeshire, from about the 10th of this month to the middle of June. It is seen about London in September. Other insects now observed, are field crickets *(gryllus campestris)*, the chaffer or may-bug *(scarabæus melolontha)*, and the forest-fly *(hippobosca equina)*, which so much annoys horses and cattle. The female wasp *(vespa vulgaris)* appears at the latter end of the month.

About this time, *bees* send forth their early swarms. Nothing can afford greater amusement than to watch the members of this industrious community in their daily journies from flower to flower.—See T.T. for 1816, p. 149; and for a list of trees, plants, and flowers, from which the bees extract their honey and wax, we refer to our volume for 1817, p. 149.

About the commencement of the month, the flowers of the lily of the valley *(convallaria maialis)* and the flowers of the chesnut tree *(fagus castanea)* begin to open; the tulip tree *(liriodendron tulipifera)* has its leaves quite out, and the flowers of the oak *(quercus robur)*, the Scotch fir *(pinus sylvestris)*, the honeysuckle, and the beech, are in full bloom. Towards the middle, the flowers of the white-thorn are quite out, and the mulberry tree *(morus nigra)* puts forth its leaves; the walnut *(juglans regia)* has its flowers in full bloom; the flowers of the garden *rose* also begin to open.

The lilac *(syringa vulgaris)*, the barberry *(berberis vulgaris)*, and the maple *(acer campestre)*, are now in flower. At the latter end of the month, rye *(secale hybernum)* is in ear; the mountain ash *(sorbus aucuparia)*, laburnum *(cytisus laburnum)*, the guelder rose *(viburnum opulus)*, clover *(trifolium pratense)*, columbines *(aquilegia vulgaris)*, the alder *(rhamnus frangula)*, the wild chervil *(chærophyllium temulum)*,

and the wayfaring tree, or guelder-rose, have their flowers full blown. The germander *(veronica chamædrys)* is seen in hedges, and various species of meadow grass are now in flower. Heart's-ease *(viola tricolor)* shows its interesting little flower in corn fields. The butter-cup *(ranunculus bulbosus)* spreads over the meadows; the cole-seed *(brassica napus)* in corn fields, bryony *(bryonia dioica)*, the arum, or cuckoo-pint, in hedges, the Tartarian honeysuckle *(lonicera tartarica)*, and the *corchorus Japonica*, now show their flowers.

Cowper has some beautiful lines in his 'Task,' appropriate to this subject:—

Laburnum, rich
In streaming gold; *syringa*, iv'ry pure;
The scentless and the scented *rose*; this red,
And of an humbler growth, the other [a] tall,
And throwing up into the darkest gloom
Of neighb'ring *cypress*, or more sable *yew*,
Her silver globes, light as the foamy surf
That the wind severs from the broken wave;
The *lilac*, various in array, now white,
Now sanguine, and her beauteous head now set
With purple spikes pyramidal, as if
Studious of ornament, yet unresolved
Which hue she most approved, she chose them all;
Copious of flow'rs the *woodbine*, pale and wan,
But well compensating her sickly looks
With never-cloying odours, early and late;
Hypericum all bloom, so thick a swarm
Of flow'rs, like flies clothing her slender rods,
That scarce a leaf appears; *mezereon* too,
Though leafless, well attired, and thick beset
With blushing wreaths, investing ev'ry spray;
Althæa with the purple eye; the *broom*,
Yellow and bright, as bullion unalloyed,
Her blossoms; and luxuriant above all
The *jasmine*, throwing wide her elegant sweets,
The deep dark green of whose unvarnished leaf
Makes more conspicuous, and illumines more
The bright profusion of her scattered stars.

The female glow-worm *(lampyris noctiluca)* is seen

[a] The Guelder-rose.

on dry banks, about woods, pastures, and hedge-ways, exhibiting, as soon as the dusk of the evening commences, the most vivid and beautiful phosphoric splendour, in form of a round spot of considerable size.

The *marine* plants which flower this month, and which are chiefly found on sea-shores and in the crevices of rocks, are, buck's horn *(plantago coronopus)*, which flowers the whole summer; burnet saxifrage *(pimpinella dioica)*, sea arrow-grass *(triglochin. maritimum)* on muddy shores; the clammy lychnis *(lychnis viscaria)*; the cerastium tetrandrum; scurvygrass *(cochlearia)*, sea-kale *(crambe maritima)* on sandy shores; the sea-cabbage *(brassica oleracea)*, the sea stork's bill *(erodium maritimum)*, the slender bird's foot trefoil *(lotus diffusus)*, the mountain flea-wort *(cineraria integrifolia)* on chalky cliffs; and the sedge *(carex arenaria)* on sea-shores.

The leafing of trees is usually completed in May.—See our last volume, p. 132; and T.T. for 1817, p. 155, for some lines on *planting trees*.

There are few objects of domestic economy affording greater interest and delight than the *dairy*, whether we view it with its brick floor and whitened walls, its latticed window, its benches with its red pans, its churn and cheese-press, in the cottage and the farm-house,—or with its floor of stone or marble, with a stream flowing through it, or a fountain bubbling up, with its walls lined with tiles of Wedgwood's ware, with rich painted borders, its marble slabs supported by arches, to put the wooden or yellow-ware vessels to hold the milk, with its gothic windows enriched with stained glass, and its furniture of old china, in the *dairy ornée* of the gentleman's or nobleman's residence. The variety of viands which it affords, from the milk, cream, butter and cheese, in their simple forms, to the custards, *blanc mange*, and ice-creams, are so many instances of its great simplicity in its first state, and of its

luxury in the other. 'A land flowing with *milk* and honey,' was the divine promise to his chosen people from the Great Creator of all things.

Sir Thomas Overbury's character of 'a fair and happy milk-maid' is probably new to many of our readers:—'A fair and happy milk-maid is a country wench that is so far from making herself beautiful by art, that one look of her's is able to put all face-physic out of countenance. She knows a fair look is but a dumb orator to commend virtue, therefore minds it not. All her excellences stand in her so silently, as if they had stolen upon her without her knowledge. The lining of her apparel (which is herself) is far better than outsides of tissue; for though she be not arrayed in the spoil of the silk-worm, she is decked in innocency, a far better wearing. She doth not, with lying long in bed, spoil both her complexion and conditions. Nature hath taught her, too immoderate sleep is rust to the soul; she rises therefore with chanticleer, and at night makes the lamb her curfew. Her breath is her own, which scents all the year long of June, like a new-made haycock. She makes her hand hard with labour, and her heart soft with pity; and when winter evenings fall early (sitting at her merry wheel) she sings a defiance to the giddy wheel of Fortune. She doth all things with so sweet a grace, it seems ignorance will not suffer her to do ill, being her mind is to do well. She bestows her year's wages at next fair; and in choosing her garments, counts no bravery in the world like decency. The garden and bee-hive are all her physic and chirurgery, and she lives the longer for't. She dares go alone, and unfold sheep in the night, and fears no manner of ill, because she means none: yet, to say the truth, she is never alone, for she is still accompanied with old songs, honest thoughts, and prayers, but short ones; yet they have their efficacy, in that they are not palled with ensuing idle cogitations. Lastly, her dreams are so pleasant,

that she dare tell them: only a Friday's dream is all her superstition; that she conceals for fear of anger. Thus lives she; and all her care is she may die in the spring-time, to have store of flowers stuck upon her winding-sheet.'

This is the season in which cheese is made; the counties most celebrated for this article are Cheshire, Wiltshire, and Gloucestershire.

The corn is benefited by a cold and windy May, as it is too apt to run into stalk, if the progress of vegetation be much accelerated by warm weather at this season. In late years, some sowing remains to be done; and in forward ones, the weeds should be well kept under.

—

Sow parsly and onions, coriander and leekes,
Smallage and basill, these four pleasant weekes:
Stirre vp your land for wheate and for rie,
And haue to your cattell a circumspect eie.
To thinne diet traine thee,
And from sloth refraine thee.

—

DESCRIPTION OF FRUIT TREES.

[Continued from p. 120.]

MULBERRY TREE (*morus nigra*).—It is not easy to distinguish the common or black mulberry from that called the white mulberry tree. The latter has the tenderest leaves, which appear a fortnight earlier than those of the black mulberry; and the tree itself is remarkably beautiful, and as well adapted for planting walks and avenues as the elm. The white mulberry tree is also cultivated in France and Italy for the sake of its leaves, which are there preferred as food for silk worms. The timber, when immersed in water, will last as long as oak, and the bark is made into strong and tough ropes. This species of mulberry tree was brought from China, upon the following occasion:—In the middle of the sixth century, two Persian monks, who were missionaries in

some of the Christian churches established in India, penetrated into the Chinese territory. They there first saw the silk-worm, and became acquainted with the secret of working up its productions into a variety of elegant fabrics. This they communicated to their sovereign, the Greek emperor, at Constantinople, and undertook to bring to the capital a sufficient number of these wonderful insects, which they performed by secreting the eggs of the silk-worm in a hollow cane. These eggs were hatched by the heat of a dunghill; and thus these insects, which were at first fed with the leaves of the wild mulberry, soon spread over Europe, so that in all considerable places extensive silk manufactories have been ever since established. The common mulberry tree bears very little fruit while young: it is larger and stronger than the white sort, and grows naturally in Persia, whence it was imported. Although the leaves of this species are less tender than those of the white mulberry, the silk produced by the insects fed upon them is said to be of the best quality, and hence they are often preferred in Spain and Portugal. The silk worms, also, prefer them, so that it is very dangerous to feed them with the leaves of the black mulberry, except in small quantities, after they have been accustomed to those of the white sort, because they often eat till they burst themselves. When these trees are intended to feed silk-worms, they should be kept in a low shrubby state of growth. If raised to produce fruit, they should be planted in grass orchards and pleasure grounds, that when the finest of the fruit drops, as it always does when ripe, it may receive no injury, and can be picked up in a state fit for the table.

Mulberries abound with a deep violet-coloured juice, which is excellent for allaying fever and removing thirst. It is, however, rather an addition to the dessert than a medicinal fruit, though the bark and root of the tree afford a safe and cooling

aperient. In Devonshire, the juice of the ripest and blackest mulberries is mixed with full-bodied cyder at the time of mixing and pressing, in such a quantity as to render the flavour perceptible. This deserves the particular attention of the other cyder counties, for the mulberry juice, when thus mixed with good strong cyder, converts it into a kind of wine, which is exceedingly grateful to most English palates, and would therefore be very profitable to the dealer, especially as the first authorities assert that the compound resembles the finest red wine, and never loses the delicious flavour of the mulberry. The fruit of this tree recommended itself to the antients long before its leaves were gathered for the food of the silk-worm; but the timber of those trees which grow in our climates is not applicable to any domestic purpose; although the fustic wood, which is found in such abundance at Campeachy, and is imported from Jamaica, is a species of mulberry. The inhabitants of China and Japan make paper of the bark of their mulberry trees; and the natives of the South Sea Islands manufacture theirs into a kind of cloth, which is, at first, fine and white, but is afterwards dyed red, and worn by their chiefs and other principal persons.

JUNE.

THE Saxons called June *weyd-monat*, because their beasts did then *weyd* or feed in the meadows.

Remarkable Days

In JUNE 1819.

1.—NICOMEDE.

NICOMEDE was a pupil of St. Peter, and was discovered to be a Christian by his burying Felicula, a martyr, in a very honourable manner. He was beaten

to death with leaden plummets, on account of his religion, in the reign of Domitian.

*3. 1658.—DR. W. HARVEY DIED,

Immortal for his discovery of the *circulation of the blood*. The private character of this great man was in every respect worthy of his public reputation. Cheerful, candid, and upright, he lived on terms of great harmony with his friends and brother physicians, and exhibited no spirit of rivalry or hostility in his career. He spoke modestly of his own merits, and generally treated his controversial antagonists with temperate and civil language, often very different from their own. By a vote of the College of Physicians, his bust in marble was placed in their hall, with a suitable inscription, recording his discoveries.

4. 1738.—KING GEORGE III BORN.

5.—SAINT BONIFACE.

Boniface was a Saxon presbyter, born in England, and at first called Winfrid. He was sent as a missionary by Pope Gregory II into Germany, where he made so many converts, that he was distinguished by the title of the *German Apostle*. He was created Bishop of Mentz in the year 145. Boniface was one of the first priests of his day, and was also a great friend and admirer of the Venerable Bede. He was murdered in a barbarous manner by the populace near Utrecht, while preaching the Christian religion.

6.—TRINITY SUNDAY.

Stephen, Bishop of Liege, first drew up an office in commemoration of the Holy Trinity, about the year 920; but the festival was not formally admitted into the Romish church till the fourteenth century, under the *pontificate* of John XXII.

*7. 1779.—BISHOP WARBURTON DIED.

To be always lamenting the miseries of life, or always seeking after the pleasures of it, equally takes us off from the work of our salvation: and though I am extremely cautious what sect I follow in religion, yet any in philosophy will serve my turn, and honest

Sancho Pancha's is as good as any; who, on his return from an important commission, when asked by his master whether he should mark the day with a white or a black stone, replied, Faith, sir, if you will be ruled by me, with neither, but with good brown ochre! What this philosopher thought of his commission, I think of human life in general; good brown ochre is the complexion of it.—See his 'Letters.'

10.—CORPUS CHRISTI.

This festival, 'the body of Christ,' was appointed in honour of the Eucharist, and always falls on the Thursday after Trinity Sunday. It is called the *Fête Dieu*, or Corpus Christi, and is one of the most remarkable festivals of the Romish church, beginning on Trinity Sunday, and ending on the Sunday following. The common mode of celebrating this festival is by grand masses, and processions of the holy sacrament only; but at Aix, in Provence, a most extraordinary procession was first introduced by King Renè, which continued till the year 1788 or 1789, and was renewed again in the year 1803.—See our last volume, p. 117, for a description of this ceremony.

11.—SAINT BARNABAS.

Our saint's proper name was *Joses;* he was descended of the tribe of Levi, and born at Cyprus. His parents being rich, had him educated at Jerusalem, under the care of Gamaliel, a learned Jew; and, after his conversion, he preached the Gospel with Paul, in various countries, for fourteen years. Barnabas suffered martyrdom at Salamis, in his native island:—being shut up all night in the synagogue by some Jews, he was, the next morning, cruelly tortured, and afterwards stoned to death. The *Epistle* which he wrote is considered genuine, though not admitted into the canon of the church.

17.—SAINT ALBAN.

St. Alban, the first Christian martyr in this island, suffered in 303. He was converted to Christianity

by Amphialus, a priest of Caerleon in Monmouthshire, who, flying from persecution, was hospitably entertained by St. Alban, at Verulam, in Hertfordshire, now called, from him, St. Albans. Amphialus being closely pursued, made his escape, dressed in St. Alban's clothes. This, however, being soon discovered, exposed St. Alban to the fury of the Pagans; and our saint refusing to perform the sacrifice to their gods, was first miserably tortured, and then put to death.

20.—TRANSLATION OF EDWARD, *King of the West Saxons.*

Edward, being barbarously murdered by his mother-in-law, was first buried at Warham, without any solemnity; but, after three years, was carried by Duke Alferus to the minster of Shrewsbury, and there interred with great pomp.

21.—LONGEST DAY.

This day is, in London, 16 h. 34 m. 5 s., allowing 9 m. 16 s. for refraction.

*21. 1813.—BATTLE OF VITTORIA.

24.—ST. JOHN THE BAPTIST, AND MIDSUMMER-DAY.

This festival is first noticed by Maximus Tauricensis, who lived about the year 400.

The custom observed in most Catholic countries, of making bonfires on the eve of St. John the Baptist, is still preserved in *Ireland*, though somewhat on the decline. An addition to it prevails here, however, never, we believe, seen abroad, that the children and cattle are made to pass through the fire; grown people will also not unfrequently do it voluntarily: it is considered a certain preservative against disease or accident. When the fire is dying away, the old women assemble round, and each takes away a burning stick to carry home with her, which is to bring a blessing on the house, and is carefully preserved till the next year. It is reckoned very dangerous to be exposed to the air after sunset on this day, for the *evil-ones* are about, and are then endowed with particular power to harm anybody. At all times

it is thought hazardous to be near a wood at night, but the risk is never so great as on St. John's eve.—(*Plumptre's Residence in Ireland.*) Consult also T.T. for 1814, p. 142; for 1817, p. 164; and our last volume, p. 139.

29.—SAINT PETER.

Peter's original name, Simon, was not abolished by Christ, but that of *Cephas* was added to it, which, in Syriac, the vulgar language of the Jews, signifies a stone or rock; hence the Greek Πέτρος, and our *Peter*. The apostle's father was Jonah, probably a fisherman of Bethsaida. His brother Andrew, being first converted, was said to be an instrument of Peter's conversion, *John* i, 40, 41.

Astronomical Occurrences

In JUNE 1819.

THE Sun enters Cancer at 59 m. after 7 in the morning of the 22d of this month, and he rises and sets, during the same period, as in the following

TABLE

Of the Sun's Rising and Setting for every fifth Day.

June	1st,	Sun	rises	53	m.	after	3.	Sets	7	m.	past	8
	6th,	-	-	-	50	-	-	-	3	-	-	10	-	-	-	8
	11th,	-	-	-	46	-	-	-	3	-	-	14	-	-	-	8
	16th,	-	-	-	43	-	-	-	3	-	-	17	-	-	-	8
	21st,	-	-	-	43	-	-	-	3	-	-	17	-	-	-	8
	26th,	-	-	-	43	-	-	-	3	-	-	17	-	-	-	8

Equation of Time.

The following numbers must be subtracted from, or added to the time indicated by a good sun-dial, in order to obtain the mean time corresponding to the time of observation.

TABLE.

				m.	*s.*
Tuesday,	June	1st,	from the time by the dial *subtract*	3	40
Sunday,	- - - -	6th,	- - - - - - - - - - - -	1	52
Friday,	- - - - -	11th,	- - - - - - - - - - - -	0	56
Wednesday,	- - -	16th,	- - - - - - - - - - - *add*	0	5
Monday,	- - - -	21st,	- - - - - - - - - - - -	1	10
Saturday,	- - - -	26th,	- - - - - - - - - - - -	2	15

Phases of the Moon

First Quarter, 1st day, at 7 m. after 4 morning.
Full Moon, - 8th, - - 30 - - - 8 - - -
Last Quarter, 14th, - - 34 - - - 10 night.
New Moon, - 22d, - - 1 - - - 3 afternoon.
First Quarter, 30th, - - 28 - - - 6 - - -

Moon's Passage over the first Meridian.

The Moon will pass the meridian of the Royal Observatory at the following times, which will be convenient for observing her in that situation, if the weather prove favourable, viz.

June 2d, at 24 m. after 7 in the evening.
3d, - 7 - - - 8 - - - -
4th, - 52 - - - 8 - - - -
5th, - 41 - - - 9 - - - -
6th, - 36 - - - 10 - - - -
7th, - 36 - - - 11 - - - -
12th, - 51 - - - 3 in the morning.
13th, - 46 - - - 4 - - - -
14th, - 36 - - - 5 - - - -

Phase of Venus.

June 1st { Enlightened part - - - - - - - - - - - 8·93173
Dark part - - - - - - - - - - - - 3·06827

Eclipses of Jupiter's Satellites.

There will be one visible eclipse of Jupiter's first satellite on the 18th day of this month, and one of his second satellite on the 29th. The immersions will take place as follows:

IMMERSIONS.

1st Satellite, 18th day, at 42 m. after 1 morning.
2d - - - 29th, - - 19 - - 5 - - -

Other Phenomena.

Saturn will be in quadrature on the 22d of this month, at half past 6 in the evening. Georgium Sidus will be in opposition at 15 m. after 11 in the morning of the 14th. The Moon will be in conjunction with Antares at 14 m. after 5 in the evening of the 7th; with Saturn at 13 m. after 11 in the morning of the

15th; with Mars at 47 m. past 5 in the morning of the 18th; with β in Taurus at 48 m. after 7 in the evening of the 21st; and with Pollux at 2 m. after 8 in the morning of the 24th.

On TIME *and its* APPLICATION.

[Continued from p. 132.]

The astronomical day, which is the interval between two consecutive passages of the Sun over the same meridian, is, in common language, divided into the two portions of day and night; these, however, separately considered, are not always of the same duration, but vary both in the same place at different times, and in different regions of the globe at the same time. These variations depend upon astronomical principles, and shall now be explained.

As the regular return of day and night results from the Earth's revolution on its axis, so the variation in these is occasioned by the inclination of this axis to the plane of its orbit; for in consequence of this inclination, and the parallelism of the axis during the Earth's annual revolution, sometimes one pole and sometimes the other is more inclined to the Sun: By this means the circle of illumination, which separates light from darkness, divides the parallels of latitude into two unequal parts, at all seasons of the year, except when the Sun is in the plane of the equator, and at that time the days and nights are equal to each other in all parts of the Earth, while at all other times they are unequal, except at the equator, where this equality is always preserved. If we suppose a line to be drawn perpendicular to the plane of the Earth's orbit, the inclination of the axis to this line will be equal to 23° 28′; and consequently, when the Sun is in either tropic, a space of 23° 28′ in breadth round the corresponding pole will be completely enlightened, and the same space round the opposite pole as entirely involved in constant darkness. The days and nights, therefore, are

equal to each other at the equator only, and gradually become more and more unequal, as the latitude increases, till there is but one day and one night, or, more properly speaking, only one period of light and one of darkness, in the course of the year at the poles.

This day and night, however, are not of equal duration, as we should be led to suppose, by regarding the position of these regions with respect to the Sun only; for various causes combine to render the day much longer than the night. A person situated at the pole would see the Sun revolving round him parallel to the horizon; hence his upper limb would first re-appear above that circle, and several revolutions would be completed before his centre could be seen, which is the time, astronomically considered, that would separate the night from the day. But as the smallest visible portion of the solar disc is sufficient to cause day, this begins several diurnal revolutions before his centre appears in the horizon. Refraction, which makes all the heavenly bodies appear more elevated than they really are, also increases this effect, and so much the more as it is greater in these cold regions where the density of the air is so much increased by the diminution of temperature. This is also confirmed by observation; for the Dutchmen who were obliged to winter in Nova Zembla, in 1597, saw the Sun rise many days before they expected his re-appearance, and long before he could have been seen, if it had not been that the refraction was so much augmented by the increase of the cold.

The revolution of the Earth about the Sun joined to the obliquity of its axis produces the regular succession of the seasons; which flow from the combined influence of the varying length of the day, and the different inclinations with which the solar rays fall upon the surface of the Earth. When the Sun crosses the equator in his progress from south to north, and

describes that part of the ecliptic which is comprised between this circle and the tropic of Cancer, it is spring with respect to the northern hemisphere, but autumn in the opposite half of the globe. During his passage from this tropic to the equator, it is summer in the northern and winter in the southern hemispheres. But as he now enters again into the opposite hemisphere, their spring and our autumn commence; and these are succeeded by summer in the former case and winter in the latter, which completes the regular gradation.

It will, therefore, readily be perceived from the preceding observations, that the duration of light at any place must principally depend upon its situation and the elevation of the Sun; or, in more astronomical language, upon the latitude of the place and the Sun's declination. When these two are known, it will be easy to find the duration of day and night at any given place. If three visual rays be supposed to be drawn from the observer, one to his zenith, another to the body at the instant its centre appears in the horizon, and a third to the pole, they will form a spherical triangle, the three sides of which are known: viz. the distance from the pole to the zenith, which may be denoted by D; the polar distance of the body, which may be represented by Δ; and the zenith distance Z of the body, which is equal to $90° +$ refraction $-$ parallax. With these data, the horary angle H, which is subtended by the side Z, may be calculated. For the more readily finding of this angle, writers on spherical trigonometry have investigated this formula, viz.

$$\text{sin. } \tfrac{1}{2} \text{ H} = \sqrt{\left(\frac{\text{sin. } \tfrac{1}{2}(\text{Z} + \Delta - \text{D}) \text{ sin. } \tfrac{1}{2}(\text{Z} + \text{D} - \Delta)}{\text{sin. } \Delta \text{ sin. D}}\right)}.$$

The angle H, when reduced into time, gives the duration between the instant of the body's rising and that of its passage over the meridian. This is also equal to half the time which it remains above the

horizon, and on this account the arc H is denominated, in astronomical language, the *semi-diurnal arc*.

Hence by substituting the values of Z, Δ, and D in this formula, we shall obtain the value of H, for the time and place corresponding to the values that are substituted, and consequently the duration of the solar day for that time and place becomes immediately known. The arc thus calculated will also answer for any of the other heavenly bodies.

To exemplify the use of this formula, and elucidate the mode of computation it requires, that the juvenile reader may be at no loss in its application, we shall select the 22d of June as an example, and find the length of that day at London. The latitude of London being nearly 51° 31′, we shall have D = 38° 29′; the Sun's declination on that day is 23° 28′, and hence his polar distance = 66° 32′, while his distance from the zenith Z = 90° + 33′ 16″ − 9″ = 90° 33′ 7″. Then, by substituting these quantities in the preceding formula, we shall have

$$\sin\tfrac{1}{2}H = \sqrt{\left(\frac{\sin\frac{1}{2}(90°33'7''+66°32'-38°29')\sin\frac{1}{2}(90°33'7''+38°29'-66°32')}{\sin 66°32'\times\sin 38°29'}\right)}$$

$$= \sqrt{\left(\frac{\sin 59°\ 18'\ 4''\times\sin 31°\ 15'\ 3''}{\sin 66°\ 32'\times\sin 38°\ 29'}\right)};$$

this, converted into logarithms, gives

$$\sin\tfrac{1}{2}H = \tfrac{1}{2}\{(9{\cdot}9544288+9{\cdot}7149880)-(9{\cdot}9625076+9{\cdot}7939907)\}$$
$$= \tfrac{1}{2}(19{\cdot}6494168-19{\cdot}7564983);$$

hence

$$\sin\tfrac{1}{2}H = 9{\cdot}9464592;$$

and therefore $H = 62° 8' \times 2 = 124° 16'$,

which is the semi-diurnal arc for the time and place required; and consequently we have the corresponding length of the day equal to

$$\frac{124°16'\times 2}{15} = 16\text{h. } 34\tfrac{2}{4}\text{m.}$$

If half this time be subtracted from 12 h., it will give the time of the Sun's rising on that day, which reject-

ing the seconds, is 43 m. after 3; while this half itself will denote the time of his setting, which is therefore at 17 m. past 8. If we take the shortest day at the same place as another example, and reject the seconds for the sake of abridging the calculation, we shall have,

$$\sin\tfrac{1}{2}H=\sqrt{\left(\frac{\sin\frac{1}{2}(90°33'+113°28'-38°29')\sin\frac{1}{2}(90°33'+38°29'-113°28')}{\sin 113°28'\times\sin 38°29'}\right)}$$

$$=\sqrt{\frac{\sin 82°46'\times\sin 7°47'}{\sin 113°28'\times\sin 38°29'}};$$

by expressing this in logarithms, we have,

$$\sin\tfrac{1}{2}H=\tfrac{1}{2}\{(9{\cdot}9965299+9{\cdot}1317064)-(9{\cdot}9625076+9{\cdot}7959907)\}$$
$$=\tfrac{1}{2}(19{\cdot}1282363-19{\cdot}7584983);$$

and therefore

$$\sin\tfrac{1}{2}H=9{\cdot}6858690, \text{ and } H=29°\,1'\times 2=58°\,2';$$

which converted into time, gives 7 h. 44 m. for the length of the shortest day in the latitude of London. It is hardly necessary to remark, that by subtracting the length of the day from 24 h., we shall obtain the corresponding night. The shortest night, for instance, at London, will be 24 h. — 16 h. 34$\frac{3}{4}$ m. = 7 h. 25$\frac{1}{4}$ m.; and the longest equal 24 h. — 7 h. 44 m. = 16 h. 16 m.

When we have a table of semi-diurnal arcs already calculated, it is only necessary to enter this table with the latitude of the place and the declination of the heavenly body as arguments, and we immediately obtain half the time which that body is above the horizon on that day; which subtracted from 12 h. when it is for the Sun, gives the time of his rising, while the number itself expresses the time of his setting. But if it be a planet, this time must be subtracted from the hour of its southing, or passing the meridian. Thus, if it were required to ascertain the time of Jupiter's rising at London on the 25th of this month, we have, in the Nautical Almanac, his declination equal to 16° 23′ S., and the time of his passing the meridian is 32 m. after 5 in the morning,

and the latitude of the place 51° 30′ nearly; then entering the table with these, we find the semi-diurnal arc equal to 4 h. 37 m. Therefore, to find the true time of Jupiter's rising and setting, we have

	h. m.		h. m.
Time of southing - - - -	5 32	- - - - - -	5 32
Semi-diurnal arc - *subtract*	4 37	- - - - *add*	4 37
Time of rising - - - - -	0 55	- - Setting	10 9

And the time of his whole duration above the horizon on that day is 9 h. 14 m.

[To be continued.]

The Naturalist's Diary

For JUNE 1819.

No gradual bloom is wanting, from the bud,
First born of spring, to summer's musky tribes;
Nor Hyacinths of purest virgin white,
Low-bent and blushing inward, nor Jonquils
Of potent fragrance, nor Narcissus fair,
As o'er the fabled fountain hanging still;
Nor broad Carnations, nor gay spotted Pinks;
Nor showered from every bush, the damask Rose,
Infinite numbers, delicacies, smells,
With hues on hues, expression cannot paint
The breath of Nature, and her endless bloom.

THOMSON.

INNUMERABLE herbs and flowers now embellish our gardens, gratify our sense of smell, and purify and renovate the atmosphere. The fields of clover (*trifolium pratense*), which are now in blossom, produce a delightful fragrance. Of this plant there are two varieties, the white and the purple; from the latter, the bees extract much honey. The bean blossoms also shed a still more exquisite odour. The *elder*, now in flower, diffuses its *Frontiniac* scent to the air, which it likewise imparts to wine made in imitation of that from the grapes growing in the neighbourhood of the town of that name in France. The sweet-scented vernal grass (*anthoxanthum odoratum*), which is the cause of the very delightful

scent of hay, flowers in this month, and diffuses its fragrance throughout the country. In the field, in the stack, in the horse-rack, or in the cow-crib, sweet hay is one of the most agreeable of perfumes.

About the beginning of this month, the pimpernel (*anagallis arvensis*), thyme (*thymus serpyllum*), the bitter sweet nightshade (*solanum dulcamara*), white bryony, the dog-rose (*rosa canina*), and the poppy (*papaver somniferum*), have their flowers full blown. The poppy (says Cowley) is scattered over the fields of corn, that all the needs of man may be easily satisfied, and that bread and sleep may be found together. See some beautiful lines on this subject in T.T. for 1816, p. 180.

Among the insects which appear in this month, one of the most interesting is, in its perfect state, the angler's may-fly (*ephemera vulgata*), which appears about the 4th, and continues nearly a fortnight. It emerges from the water, where it passes its aurelia state, about six in the evening, and dies about eleven at night. There are also the grasshopper (*gryllus*), the golden-green beetle (*scarabæus auratus*), various kinds of flies; the cuckoo-spit insect (*cicada spumaria*), and the stag-beetle (*lucanus cervus*). The several species of the gad-fly (*œstrus bovis—equi*—and *ovis*), the ox, horse, and sheep gad-fly, make their appearance in this month.

The fern-owl may be seen, in the evening, among the branches of oaks, in pursuit of its favourite repast, the fern-chaffer (*scarabæus solstitialis*).

The several kinds of *corn* come into ear and flower during this month, as well as most of the numerous species of *grasses*. See our last volume, p. 205, for an account of the various kinds of wheat; and p. 150 for a description of the grasses.

Gooseberries, currants, and strawberries, now begin to ripen. The hay harvest commences about the end of the month, in the southern and midland parts of the kingdom. About this time, also, birds cease

their notes. No birds are heard after the end of June, except the stone curlew (*charadrius œdicnemus*) whistling late at night; the yellow hammer, goldfinch, and golden-crested wren, now and then chirping. The cuckoo's note also ceases.

The good farmer now follows up his weeding with diligence. The charlock (*sinapis arvensis*) exhibits its yellow flowers among the corn, and, if it be suffered to spread, sometimes shows an expanse of yellow instead of green. A similar usurpation of blue sometimes takes place when the bugloss *(anchusa sempervirens)*, called in some country places, cat's-tail, is suffered to increase, and a scarlet one from the poppy: ironweed is less conspicuous, but the thistles now shoot fast, and, if not cut down in time, the winged seeds will in autumn fly all over the country. A Yorkshire thistle may perhaps wing its way into Middlesex. The *cockle* shows its beautiful red flowers among the corn, but is a pernicious weed, and spoils the sample when exhibited in the market. All these appearances are a disgrace and beggary to the farmer and to the country. The yellow rattle is a great nuisance in the pasture and mowing fields, but it is a weed which is easily pulled up by the roots.

A *sheepwashing* is a most rural and pleasing sight. The wash-pit, or wash-brook, is prepared, perhaps, by the banks on each side of a brook being defended by brick-work, or by planks, and a dam is made of earth, or clay, or the water is kept up by gates or boards. A large fold is made with hurdles by the side, and a smaller one, or pen, within it close to the pit. Here the sheep are brought in, by a pen-full at a time, from whence they are thrown into the pit, and kept in by a rope across the opposite end to the dam. Within the rope stands the washer, who rubs each in his turn, and, when done, puts it under the rope, from whence it swims to a

gradually shelving place, till it feels the bottom with its legs, when, with its coat fully charged with water, it gets slowly out, dripping as it goes, till it has sufficiently recovered itself to shake the water off; it then joins its bleating comrades in the field. The washer is paid, perhaps, eighteen-pence a score for the washing, out of which he pays two-pence a score to the owner of the pit and close, if it be a hired one. He may wash from one to two thousand in a season. The wool collected from the pit afterwards is a good perquisite. The water which runs from a sheep-wash is very destructive to fish.

> Refulgent Summer now his hot domain
> Hath carried to the tropic, and begins
> His backward journey. Now beneath the sun
> Mellowing their fleeces for th' impending shears,
> The woolly people in full clothing sweat;
> When the smooth current of a limpid brook
> The shepherd seeks, and, plunging in its waves
> The frighted innocents, their whitening robes
> In the clear stream grow pure. Emerging hence,
> On littered straw the bleating flocks recline
> Till glowing heat shall dry, and breathing dews,
> Perspiring soft, again through all the fleece
> Diffuse their oily fatness. Then the swain
> Prepares th' elastic shears, and gently down
> The patient creature lays; divesting soon
> Its lightened limbs of their encumbering load.

The following plants are generally seen in flower about the end of June: goat's beard *(tragopogon pratense)*, deadly nightshade *(atropa belladonna)*, meadow-sweet *(spiræa ulmaria)*, the day-lily *(hemerocallis flava)*, the jasmine *(jasminum officinale)*, and the holy-oak *(alcea rosea)*. The laurels and other evergreens now make their fresh shoots, while the old leaves turn yellow and fall off.

The *rose* is one of the greatest ornaments of our garden in this month, yet like the rest of its sister tribe, and that beauty of which it is so often mentioned as an emblem, quickly hastens to decay.

The Moss Rose.

[From the German.]

The angel of the flowers, one day,
Beneath a rose-tree sleeping lay,
That Spirit—to whose charge is given
To bathe young buds in dews from heaven,
Awaking from his light repose,
The Angel whispered to the Rose:
'O fondest object of my care,
Still fairest found where all are fair,
For the sweet shade thou'st given to me,
Ask what thou wilt, 'tis granted thee.'
'Then,' said the Rose, with deepened glow,
'On me another grace bestow.'
The Spirit paused, in silent thought,
What grace was there that flower had not!
'Twas but a moment—o'er the Rose
A *veil of moss* the angel throws,
And, robed in nature's simplest weed,
Could there a flower that Rose exceed?

Mackerel *(scomber, scomber)* are taken in great abundance in this month. Such is sometimes the profusion of this fish, that a single boat has been known to take 120,000, and the price on the spot, to those who purchase them for sale, is half a guinea per thousand. After having travelled many miles, and gone through many hands, they are sold, at inland places, at from eighteen-pence to three-pence each.

The *maritime plants* which flower this month, are, the sea-barley (*hordeum maritimum*), sulphur-wort *(pucedanum officinale)*, and loose sedge (*carex distans*), in salt marshes; the sea-plantain *(plantago maritima)*, among rocks on the sea-coast; the slender-leaved buffonia *(buffonia tenuifolia)*, and the tassel pond weed *(ruppia maritima)*, in salt water ditches. To these may be added, the common alkanet (*anchusa officinalis*), the narrow-leaved pepperwort (*lepidum ruderale*), and the Roman nettle *(urtica pilulifera)*, in sea wastes; the black saltwort *(glaux maritima)*, on muddy shores; the sea-

chickweed *(arenaria peploides)*, and the common sea-rocket *(bunias cakile)*, on sandy shores; and the perfoliate cabbage *(brassica orientalis)* among maritime rocks.

The trees now make their second or *midsummer shoots*, the younger and lighter shades of which form a variety and contrast to the darker colours of the first shoots.

The innumerable species of *insects* that are called into life by the heat in this month, afford a never failing source of amusement and instruction to the admirer of Nature's minutest works. Many of these are only discoverable by the *microscope*, and are eminently worthy of our observation. They who possess this amusing instrument may easily perform with it a variety of pleasing experiments; among others, the following:—

Leave some vinegar exposed, in a saucer, for a few days, to the open air; then place a drop of it, by means of a clean pen, or camel's hair brush, on the transparent object-plate of the microscope; and if the object-plate be properly illuminated from below, you will observe in this drop of liquor animals resembling small eels, which are in continual motion.

If you slightly bruise some pepper corns, and infuse them in water for a few days, and then expose a drop of it to the microscope, a number of animals of a different kind will be visible. These are of an oblong shape, and, like the others, in continual motion, going backwards and forwards in all directions, turning aside when they meet each other, or when their passage is stopped by some obstacle. In other infusions, as in that of new hay, differently shaped animalcula will be found. When the drop in which they swim, and which to them is like a pond, becomes diminished by evaporation, they gradually retire towards the middle, where they accumulate, and at length perish when entirely deprived of

moisture. Previously to this they appear in great distress, writhe their bodies, and endeavour to escape from that state of uneasiness which they evidently feel. If the smallest quantity or drop of sulphuric acid be put into a drop of the infusion, which swarms with these insects, they immediately throw themselves on their backs, and expire; sometimes losing their skin, which bursts, and suffers small particles of air to escape.

Those who wish to observe the circulation of the blood, by means of the microscope, may readily obtain the desired satisfaction. The objects employed chiefly for this purpose are the delicate transparent members which unite the toes of the frog and the tail of the tadpole. If this member be extended, and fixed on a piece of glass illuminated below, the motion of the blood in the vessels will be distinctly visible; the appearance resembles a number of small islands with a rapid current flowing between them. Take a small tadpole, and, having wrapped its body in a piece of moist cloth, place its tail on the object-plate of the microscope, and enlighten it below, and you will see very distinctly the circulation of the blood, which in some of the vessels proceeds by a kind of undulations, and in others with an uniform motion. The former are thought to be the arteries in which the blood moves, in consequence of the alternate pulsation of the heart; the latter are said to be the veins. The circulation of the blood may be seen also in the legs and tails of shrimps. The transparent legs of small spiders, and those of bugs, will also afford the means of observing the circulation of the blood. The latter are said, by Mr. Baker, to exhibit an extraordinary vibration of the vessels, which he never saw any where else. Very small fish are good objects for this purpose: but the most curious of all spectacles of this kind, is that exhibited by the mesentery of a living frog, applied in particular

to the solar microscope. According to Mr. Baker, who saw the fact which he describes, it is impossible to express the wonderful scene which presented itself to his observation. 'We saw,' he says, 'at the same moment, the blood, which flowed in a prodigious number of vessels, moving in some to one side, and in others to the opposite side. Several of these minute vessels were magnified so as to appear an inch in diameter, and the globules of blood seemed almost as large as small grains of pepper, while in some vessels they could pass only one by one, and were obliged to change their figure into that of an oblong spheroid before they could pass.'

If any doubt that the blood is formed of small particles, he may easily obtain an ocular demonstration of the subject. With the tip of a fine pen, or camel's hair brush, take a small drop of blood, just drawn from the body, and spread it as thin as possible over a piece of talc, to which apply one of the most powerful magnifiers, and the globules will be distinctly seen. By this simple method it has been found that the red globules of the human blood are each composed of six smaller globules, united together, and that, when disunited by any cause, they are no longer red. These globules are so exceedingly minute, that their diameter is only about the 1600th part of an inch, so that a sphere of one-tenth of an inch in diameter would contain 4,096,000, or more than four millions of them.

To proceed to the skin, its pores, and scales. If you take off a small piece of the epidermis, or scarf-skin, of the hand, by means of a sharp razor, and place it on the object-plate of the microscope, you will see it covered with a multitude of small scales so exceedingly minute, that, according to Leeuwenhoek, a grain of sand would cover 200 of them. These scales are arranged like those on the back of fishes, or like the tiles of a house, each, in part, covering the other. If the form of these little scales

be to be ascertained, scrape the skin with a penknife, and put the dust thus obtained into a drop of water, and it will be seen that these scales, small as they are, have, in general, five planes, and that each consists of several strata. Underneath these scales are the pores of the epidermis, which when the former are removed may be distinctly seen, apparently like small holes pierced with an exceedingly fine needle. In the length of an inch 1200 have been counted, so that, in a surface equal to a square inch, there are 14,400; and as there are 144 inches in a square foot, the number of pores in a square foot of surface would be more than two millions; and as the surface of the human body is reckoned at 14 feet, the number of pores in its surface, through which there is a perpetual perspiration going on, must be more than 28 millions. Each of these pores, indeed, corresponds in the skin to an excretory tube, the edge of which is lined with the epidermis. When the epidermis has been detached from the skin, these internal prolongations of the epidermis may be observed in the same manner as we see in the reverse of a piece of paper pierced with a blunt needle. The pores of the skin are more particularly remarkable in the hands and feet. For if we wash the hands well with soap and water, and then look at the several parts with a magnifier, we shall observe a multitude of furrows, between which the pores are situated.

The hairs of animals, seen through a microscope, appear to be organized bodies: they are composed of long, slender, hollow tubes: some seem to be composed of several small hairs, covered with a common bark; others are hollow throughout. The bristles of a cat's whisker, when cut transversely, exhibit the appearance of a medullary part which occupies the middle, like the pith in the twig of the elder-tree. Those of the hedgehog contain a kind of

real marrow, which is whitish, and formed of radii meeting in a centre.

The eyes of insects have afforded much room for microscopic observation. The greater part of insects have not moveable eyes, which they can cover with eyelids at pleasure. In these, the eyes are immoveable, and, as they are deprived of a covering to defend them from injuries, nature has supplied this deficiency, by forming them of a kind of corneous substance, proper for resisting the shocks to which they might be exposed. But it is not in this, that the great singularity of the eyes of insects consists. By the microscope, we find these eyes are themselves divided into a prodigious multitude of others much smaller. Some flies are said to have several thousand eyes. In all the different species they are disposed in a different manner. The dragon fly, besides the two hemispherical excrescences on the sides, which are visible to the naked eye, has between these two other eminences, the upper and convex surface of which is furnished with a multitude of eyes. The same insect has three also in front, in the form of an obtuse and rounded cone. It is an agreeable spectacle, says Leeuwenhoek, to examine this multitude of eyes in insects; for, if the observer be in a proper position, the surrounding objects appear painted on these spherical eminences; and, by means of the microscope, they are seen multiplied, almost as many times as there are eyes, and in such a distinct manner, as can never be attained by art[1].

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As companions *to Sir Thomas Overbury's character of a fair milkmaid,* given at p. 137, the reader may take the following beautiful song, and the fair milkmaid's answer thereto:—

[1] Continued at the end of next month's Diary: see also our last volume, p. 154.

The SHEPHERD'S SONG.

Come live with *me*, and be *my* love,
And we will all the pleasures prove,
That vallies, groves, or hills, or field,
Or woods, and steepy mountains yield.

Where we will sit upon the rocks,
And see the shepherds feed our flocks,
By shallow rivers, to whose falls
Melodious birds sing madrigals.

And I will make thee beds of roses,
And then a thousand fragrant posies,
A cap of flowers, and a kirtle,
Embroidered all with leaves of myrtle.

A gown made of the finest wool,
Which from our pretty lambs we pull;
Slippers, lined choicely for the cold,
With buckles of the purest gold.

A belt of straw, and ivy buds,
With coral clasps, and amber studs;
And if these pleasures may thee move,
Come live with *me*, and be *my* love.

Thy silver dishes for thy meat,
As precious as the gods do eat,
Shall on an ivory table be
Prepared each day for *thee* and *me*.

The shepherd swains shall dance and sing
For thy delight each May morning;
If these delights thy mind may move,
Then live with *me*, and be my love. MARLOW.

The MILK-MAID'S ANSWER.

If all the world and love were young,
And truth in every shepherd's tongue,
These pretty pleasures might me move,
To live with *thee*, and be *thy* love.

But time drives flocks from field to fold,
When rivers rage, and rocks grow cold,
Then *Philomel* becometh dumb,
And age complains of care to come.

The flowers do fade, and wanton fields
To wayward winter reckoning yields;
A honey tongue, a heart of gall,
Is fancy's spring, but sorrow's fall.

Thy gowns, thy shoes, thy beds of roses,
Thy cap, thy kirtle, and thy posies,
Soon break, soon wither, soon forgotten,
In folly ripe, in reason rotten.

Thy belt of straw, and ivy buds,
Thy coral clasps, and amber studs,
All these in me no means can move
To come to *thee*, and be *thy* love.

Why should we talk of dainties then,
Of better meat than's fit for men?
These are but vain; that's only good
Which God hath blessed, and sent for food.

But could youth last, and love stil breed,
Had joys no date, nor age no need;
Then those delights my mind might move
To live with *thee*, and be *thy* love. MARLOW.

Your doong carrie out to comfort your feeld,
And bring home such fewel as your woods yeeld;
Mow downe your medowes, which do lie lowe,
And tender herbe seeds this moneth you must sow.
Take drinke to content thee,
If thirst doe torment thee.

The simple sheepe, for shepheardes care,
Mow payes him home with lambe and wool;
But some too greedy make no spare
Both fell and fleece at once to pull.

DESCRIPTION OF FRUIT TREES.

[Continued from p. 140.]

NECTARINE TREE *(amygdalus persica)*.—Botanists allow this to be only a variety of the peach tree. It certainly is not easy for a common eye to distinguish between the two trees when they are not in a state of fructification, nor will the differences then observable authorize us to pronounce them specifically separate. The nectarine is generally a lower tree than the peach; the trunk and branches are, however, larger, besides being covered with a lighter bark. The twigs are tenderer and inclining to red. The flowers are smaller and of a darker red colour. These differences, however, are often trifling, and by no means

constant. The grand distinction is certainly in the fruit, which is smaller and rounder, with a firmer pulp and a smoother skin. It derives its classical name from the rich, racy, and *nectareous* flavour of its juice, which, in its highest perfection, renders it the most delicious of all European fruits, and, perhaps, surpasses that of the boasted products of hotter climes. The best sorts of nectarine are those called the *Newington* and the *Roman*. The first is a fine large fruit, of a beautiful red colour towards the sun, and of a bright yellow towards the wall; the juice is very rich; the pulp adheres closely to the stone, where it is very red; and the fruit ripens at the end of August or beginning of September. The Roman red nectarine has a deep red or purple colour towards the sun, but next the wall has a yellowish cast; the pulp is firm, adheres closely to the stone, and ripens in September. It requires a very close attention to distinguish the trees which bear the different varieties of this exquisite fruit. The same sort of trees, planted in different soils and situations, often alter their fruit so much as to deceive the best judges.—See

PEACH TREE *(amygdalus persica)*.—This, in its natural state, is a small tree, with spreading branches. It grows rapidly, but is not a long liver. There are many varieties of the fruit for which the peach tree is principally cultivated; but the trees themselves are valuable in another respect, for there are few that are more ornamental for plantations, shrubberies, and wilderness quarters, especially when placed in view of the mansion house, and in sheltered situations, where they will display their beautiful blossoms about the beginning of April, when flowers, especially upon trees, are peculiarly valuable. The variety with double flowers is the most elegant of all the ornamental trees; at least, with the exception of the *almond* tree, it is the most beautiful flowering tree that will live in the open air of our variable cli-

mate. Its blossoms appear about three weeks later than those of the common peach, and are generally followed by some fruit, which it must be confessed is not of any value, except where the trees have been trained against sunny walls.

The most valuable kinds of peach trees are the following:—The early *purple* peach, the fruit of which is large, round, and externally of a fine red colour; the flesh is white, but very red at the stone. It is particularly esteemed for being full of a rich vinous-flavoured juice. The next sort we shall notice is the large or French mignon *(grosse mignonne)*, the fruit of which is rather egg-shaped, only often swelling on one side. It has a fine external colour, a sugary juice, and a very small stone. As it ripens in the middle of August, and separates from the stone, it is allowed to be one of the finest peaches. The best method of treating this tree is to bud it into some old healthy apricot, planted in a south east aspect, and to cut away the apricot when the buds have taken and produced shoots. The *belle chevreuse* is an excellent bearer; the fruit is red, the flesh white, but red at the stone, from which it separates: it is very full of a rich sugary juice, and ripens at the end of August. The *Chancellor* has a white melting flesh, which separates from the stone, where it is of a fine red colour; the skin is thin and the juice very rich: it ripens about the end of August, and should be budded on an apricot like the mignon, as it thrives better under that treatment than upon common stocks. These are the sorts most worthy of cultivation; though in very warm situations the *Catharine* peach should be introduced, as it is an excellent fruit in hot summers.

An eminent gardener describes a good peach as follows: the flesh should be firm, the skin thin, next the sun of a bright red colour, and of a yellowish cast next the wall; the pulp should be very thick, yellowish, and full of high-flavoured juice. This fruit

is known to be grateful and wholesome, seldom disagreeing with a healthy stomach, except when eaten to excess. The flowers are used for medicinal purposes; they have an agreeable weak smell and a bitterish taste; they are made into a syrup, which is given as an opening medicine to children, principally to destroy worms. Care, however, should be taken not to confound the flowers of those peach trees which have been grafted on the plum, with those raised from *almond* stocks. The former are more decidedly cathartic, and the latter lose all their aperient qualities by being grafted on the almond tree, which is a species of the same genus as the peach. It is true the almond tree in England produces no fruit of any consequence; yet it is not only valuable for the above purpose, but also as an ornamental tree in clumps and shrubberies, where it exhibits its delicate red-purple bloom in the month of March, when few other trees have either leaves or flowers. An almond tree thus covered with blossoms is one of the most elegant objects in nature.

JULY.

THIS word is derived from the Latin *Julius*, the surname of C. Cæsar, the dictator, who was born in it. Mark Anthony first gave to this month the name of July, which was before called *Quintilis*, as being the fifth month in the year, in the old Roman calendar established by Romulus. July was called by the Saxons *heu-monat*, or *hey-monat*, because therein they usually mowed, and made their hay-harvest.

Remarkable Days

In JULY 1819.

*1. 1818.—SIR THOMAS BERNARD DIED,

Well known for his zealous labours and writings in behalf of public charities, and other useful institu-

tions; as well as for his conduct of the Society for Bettering the Condition and Increasing the Comforts of the Poor, the Reports of which he published annually.

2.—VISITATION OF THE BLESSED VIRGIN MARY.

This festival was first instituted by Pope Urban VI, in commemoration of that remarkable journey which the Mother of our Lord took into the mountains of Judæa, in order to visit the mother of St. John the Baptist. It was afterwards confirmed, not only by a decree of Pope Boniface IX, but by the council of Basil, in 1441.

3.—DOG-DAYS BEGIN.

These are a certain number of days before and after the heliacal rising of *Canicula*, or the dog-star, in the morning. The dog-days in our modern Almanacks occupy the time from July 3d to August 11th; the name being applied now, as it was formerly, to the hottest time of the year.

4.—TRANSLATION OF ST. MARTIN.

This day was appointed to commemorate the removal or translation of St. Martin's body from one tomb to another much more noble and magnificent; an honour conferred upon the deceased saint by Perpetuus, one of his successors in the see of Tours. His festival is celebrated on the 11th of November, which see.

7.—THOMAS A BECKET.

This haughty prelate was born in London, in the year 1119, and was the son of Gilbert, a merchant, and Matilda, a Saracen lady, who is said to have fallen in love with him when he was a prisoner to her father in Jerusalem. Thomas received the first part of his education at Merton Abbey in Surrey, whence he went to Oxford, and afterwards studied at Paris. In 1159, he made a campaign with King Henry to Toulouse, having in his own pay 1200 horse, besides a retinue of 700 knights or gentlemen.

For further particulars respecting Becket we refer

to T.T. for 1814, pp. 166-172, and T.T. for 1815, p. 220.

*7.—CAMBRIDGE COMMENCEMENT.

At this period the Doctors, Masters of Arts, and others *commence* their degrees. This is a grand public time at that University, and is often attended by much company. The annual prizes are then recited in the Senate-House, and oratorios and concerts sometimes performed. The new Chancellor is also installed at this time. The last installation took place in 1811, when H. R. H. the Duke of Gloucester exhibited the gratifying sight of a Prince anxious not to obtain extensive empire and military fame, but to preside over a *learned* body.

The period corresponding with Cambridge *commencement* at the sister University, and which is there held with great solemnity, is called the Oxford *Act*.

*10. 1212.—FIRE AT LONDON BRIDGE,

Which, by a singular though most disastrous dispensation, occurring at *both* ends of the structure, then covered with houses, caused the death of more than 3000 persons.

*13. 1793.—MARAT ASSASSINATED

By Charlotte Cordé; who, with exalted though mistaken heroism, when led to execution, exclaimed, "'Tis guilt makes shame, and not the scaffold!"

15.—SAINT SWITHIN.

Swithin, in the Saxon *Swithun*, received his clerical tonsure, and put on the monastic habit, in the old monastery at Winchester. He was of noble parentage, and passed his youth in the study of grammar, philosophy, and the scriptures. Swithin was promoted to holy orders by Helmstan, Bishop of Winchester, at whose death, in 852, King Ethelwolf granted him the see. In this he continued eleven years, and died in 868. For some remarks on the popular saying respecting St. Swithin, see our former volumes.

*15. 1817.—MADAME DE STAEL DIED.

In point of intellect, literary attainments, and splendour of character, Madame de Stael-Holstein (daughter of M. Necker, so distinguished before the French revolution for his financial talents) was one of the most extraordinary women of her age. 'Her character,' says Lady Morgan in her "France," 'was uniformly described to me, by her friends, as largely partaking of a disposition whose kindness knew no bounds; and of feelings which lent themselves in ready sympathy to every claim of friendship, and every call of benevolence. Among those who knew her well, the splendour of her reputation seems sunk in the popularity of her character; and "*c'est une excellente personne*"—"*c'est un bon enfant*," were epithets of praise constantly lavished on one who has so many more brilliant claims to celebrity.' She died at Paris, aged 53; having, only the evening before, enjoyed the fresh air of her garden. She expired in a gentle slumber; and it is remarkable, that, as if foreseeing this catastrophe, she never, for some months previous to her dissolution, felt an inclination to sleep without dread.

*15. 1662.—ROYAL SOCIETY CHARTERED.

The Royal Society, on the day of its creation, was the whetstone of the wit of their patron Charles II. With a peculiar gravity of countenance, he proposed to the assembly the following question for their solution:—'Suppose two pails of water were fixed in two different scales equally poised, and which weighed equally alike, and that two live bream, or small fish, were put into either of these pails, he wanted to know the reason why that pail, with such addition, should not weigh more than the other pail which stood against it.'—Every one was ready to set at rest the royal curiosity; but it appeared that every one was giving a different opinion. One, at length, offered so ridiculous a solution, that another of the members could not refrain from a loud laugh; when

the King, turning to him, insisted that he should give his sentiments as well as the rest. This he did without hesitation, and told his Majesty, in plain terms, that he denied the fact. On which the King, in high mirth, exclaimed, 'Odds fish, brother, you are in the right!'

20.—SAINT MARGARET.

She was born at Antioch, and was the daughter of a Pagan priest. Olybius, president of the East, under the Romans, wished to marry her; but finding that Margaret was a Christian, he postponed his intended nuptials until he could prevail on her to renounce her religion. Our saint, however, was inflexible, and was first tortured, and then beheaded, in the year 278.

22.—MARY MAGDALEN.

This day was first dedicated to the memory of St. Mary Magdalen, by King Edward VI. And in his Common Prayer, the *Gospel* for the day is from St. Luke, chap. vii, verse 36. Our reformers, however, upon a more strict inquiry, finding it doubtful whether this woman, mentioned in the Gospel, was really Mary Magdalen, thought it prudent to discontinue the festival.

25.—SAINT JAMES.

James was surnamed the *Great*, either on account of his age, being esteemed older than the other *James*, or for some particular honour conferred upon him by our Lord. He was by birth a Galilean, and partner with Peter in fishing, from which our Lord called him to be one of his disciples: *Mark* i, 19, 20. Of his ardent zeal, no other proof is necessary than his becoming the victim of Herod Agrippa. The Spaniards esteem James their tutelar saint.

26.—SAINT ANNE.

She was the mother of the Virgin Mary, and the wife of Joachim her father. Her festival is celebrated by the Latin church.

Astronomical Occurrences

In JULY 1819.

THE Sun enters Leo at 48 m. after 6 in the evening of the 23d of this month, and he rises and sets during the same period as in the following

TABLE

Of the Sun's Rising and Setting for every fifth Day.

July	1st,	Sun rises	46	m. after	3.	Sets	14	m. after	8
	6th,	- - -	49	- -	3	-	11	- -	8
	11th,	- - -	52	- -	3	-	8	- -	8
	16th,	- - -	57	- -	3	-	3	- -	8
	21st,	- - -	3	- -	4	-	57	- -	7
	26th,	- - -	10	- -	4	-	50	- -	7
	31st,	- - -	18	- -	4	-	42	- -	7

Equation of Time.

The numbers in the following table must be added to the time as shown by a good sun-dial, in order to have the mean time at the instant as shown by a well regulated clock.

TABLE.

			m.	s.
Thursday,	July	1st, to the time by the dial *add*	3	16
Tuesday,	- - -	6th, - - - - - - - - - -	4	11
Sunday,	- - - -	11th, - - - - - - - - - -	4	58
Friday,	- - - -	16th, - - - - - - - - - -	5	34
Wednesday,	- -	21st, - - - - - - - - - -	5	58
Monday,	- - - -	26th, - - - - - - - - - -	6	9
Saturday,	- - -	31st, - - - - - - - - - -	6	4

Phases of the Moon.

Full Moon,	-	7th day,	20	m. after	3	afternoon.
Last Quarter,	14th	-	53	- -	6	morning.
New Moon,	- 22d	-	47	- -	5	- - -
First Quarter,	30th	-	8	- -	6	- - -

Moon's Passage over the first Meridian.

Should the weather prove favourable, the Moon may be seen to pass the first meridian, adopted by the astronomers of this country, at the following times during this month: viz.

July 2d, 24 m. after 7 in the evening.
3d, 14 - - 8 - - - - -
4th, 11 - - 9 - - - - -
5th, 13 - - 10 - - - - -
6th, 20 - - 11 - - - - -
11th, 28 - - 3 in the morning.
12th, 12 - - 4 - - - - -
13th, 59 - - 4 - - - - -
31st, 55 - - 6 in the evening.

Phase of Venus.

July 1st { Enlightened part - - - - - - - 10·67603 digits.
Dark part - - - - - - - - - 1·32397 - - -

Eclipses of Jupiter's Satellites.

There will be four eclipses of Jupiter's first satellite visible at the Royal Observatory this month, and two of his second satellite: the immersions will take place within a few seconds of the following times:

1st Satellite, 3d day, at 59 m. after 11 at night.
11th - 53 - - 1 morning.
19th - 16 - - 10 evening.
27th - 11 - - 0 morning.
2d Satellite, 16th - 46 - - 11 night.
24th - 21 - - 2 morning.

Form of Saturn's Ring.

July 1st { Transverse axis - - - - - - - - - - 1·000
Conjugate axis - - - - - - - - - - - —0·093

Other Phenomena.

Mercury will be in superior conjunction at $\frac{1}{2}$ past 3 in the afternoon of the 1st of this month. He will also be in conjunction with α in Leo on the 27th, when the star will be $7\frac{1}{3}'$ south of the planet. The Moon will be in conjunction with α in Scorpio at 34 m. after 3 in the morning of the 5th; with Saturn at 59 m. after 6 in the evening of the 12th; with β in Taurus, at 30 m. past 1 in the morning of the 19th; and with Pollux at 2 in the afternoon of the 21st.

On TIME *and its* APPLICATION.

[Continued from p. 151.]

One of the most important applications of time, is that which constitutes the science of chronology, or

the arrangement of historical events according to the order of the epochs at which they happened. One of the chief bases upon which this science rests, is astronomy. Accordingly, we find that chronology, comparatively speaking, is but a modern science; for until astronomy had made great progress, and the doctrine and calculation of eclipses become well understood, their application to the purpose of determining the epochs of ancient events could not take place. Besides the natural and obvious divisions of time, as years, months, weeks and days, which result from the immediate revolutions of the heavenly bodies, there are others which result from the less obvious consequences of these revolutions, and which are denominated *cycles* and *periods*. These cycles have chiefly arisen from the incommensurability of the revolutions of the heavenly bodies with each other. The apparent revolution of the Sun about the Earth being arbitrarily divided into 24 h., becomes the basis of all our mensuration of time. But neither the annual motion of the Sun nor that of the other heavenly bodies can be measured exactly by hours and their multiples. The Earth, for instance, occupies nearly 365 d. 5 h. and 49 m. in making one revolution in her orbit, which period constitutes the length of our year; and the Moon requires 29 d. 12 h. and 44 m. to complete one revolution about the Earth: it was therefore to express a number of complete revolutions in years and days only that cycles were introduced. A cycle is, therefore, such a period of time, which, after several revolutions of the same body, bring it to the same place in the heavens, or to the same division of time.

The cycle of the Sun is a period of 28 years, in which the days of the month return again to the same days of the week; the Sun's place to the same signs and degrees of the ecliptic on the same months and days; or at least so nearly so as to deviate only about one degree in 100 years. The leap years also begin

the same course over again with respect to the days of the week on which the days of the month fall.

The cycle of the Moon is a period of 19 years, after which period the conjunctions, oppositions, and other aspects of the Moon return to the same state as they were at the commencement of this period, and happen within about an hour and a half of the same time. The Roman indiction is a period of 15 years, established for the purpose of indicating the time of certain payments due to the republic. This indiction was established in the 312th year of the christian era.

The christian era commenced in the 9th year of the solar and the 1st of the lunar cycle; therefore to find the year of the solar cycle at any time, add 9 to the given year of the christian era, and divide the sum by 28; the quotient will be the number of cycles, and the remainder the cycle for the given year. If there be not any remainder, the cycle is 28. Thus, if the cycle were required for 1819, we should have $1819 + 9 = 1828$, which divided by 28, gives 65 for the number of complete cycles, and 8 for the year of the present cycle. To find the lunar cycle, add 1 to the year of Christ, and divide by 19; the quotient will be the number of cycles elapsed in the interval, and the remainder will be the state of the cycle at the given time. Hence for the present year we have $1819 + 1 = 1820$, which divided by 19, gives 95 for the number of complete cycles, and 15 for the year of the present cycle. Again, if the Roman indiction were required, 312 must be subtracted from the given year of the christian era, and the remainder divided by 15. For the present year we have $1819 - 312 = 1507$; and $1507 \div 15 = 100$, with 7 for the remainder, which is therefore the indiction for this year.—The cycle of Easter, or the Dionysian period, is a space of 532 years, produced by multiplying the two former cycles of 28 and 19 years together. The *Julian period* is another division of time, which

was anciently much used, and is now occasionally referred to, especially in some works on astronomy. This period embraces a duration of 7980 years, and is equal to the continued product of the three preceding periods; for $28 \times 19 \times 15 = 7980$. As the christian era commenced in the 4713th year of this period, whenever the Julian year is required, it will be sufficient to add this number to the current year. For example, if it were required to find the Julian year answering to 1819, we have $4713 + 1819 = 6532$, the year required.

The principal application, however, of modern astronomy to the purposes of chronology is in ascertaining the uncertain dates of ancient events; and in this respect the powers of Newton conferred the greatest service on that science. The following specimen will show the manner in which his astronomical knowledge was employed for this purpose.

The sphere was formed by Chiron and Musæus at the time, and for the purpose of the Argonautic expedition, as is evident from the reference which several of the asterisms have to that event. At this time the cardinal points of the equinoxes and solstices were placed in the middle of the constellations Aries, Cancer, Libra, and Capricorn. Newton establishes this point by a consideration of the ancient Greek calendar, which consisted of 12 lunar months, and each month of 30 days, and therefore required an intercalary month, began sometimes a week or a fortnight before or after the equinox or solstice; and hence the first astronomers were led to the preceding disposition of the equinoxes and solstices; which is also confirmed by the direct testimonies of Eudoxus, Aratus, and Hipparchus. This being established as a basis, Sir Isaac reasons in the following manner.

At the end of the year 1689, the equinoctial colure cut the ecliptic in 6° 44′ of Taurus, and by this reckoning the equinox was then gone back 36° 44′

since the Argonautic expedition. But it recedes 54″ in a year, or 1° in 72 years, and consequently 46° 44′ would require 2645 years; which reckoned backward from the beginning of 1690, will place this expedition about 25 years after the death of Solomon. But, as there is no necessity for allowing that the middle of the constellations, according to the general account of the ancients, should be precisely the middle between the *prima arietis* and *ultima caudæ*, Newton then endeavours to determine the stars through which Eudoxus made the colures pass in the primitive sphere, and by this means to fix the position of the cardinal points. From the mean of five places he finds that the great circle, which in the primitive sphere described by Eudoxus, or at the time of the Argonautic expedition, was the equinoctial colure, did, at the end of 1689, cut the ecliptic in 6° 29′ 15″ of Taurus. In this manner, he likewise determines the mean place of the solstitial colure to be 6° 28′ 46″ of Leo; and as this is so nearly at right angles with the former, the difference being less than half a minute of a degree, he concludes that it is rightly drawn. From this conclusion, he also infers that, from the Argonautic expedition to 1689, the cardinal points had receded from the colures 1 sign 6° and 29′; which amounts to 2627 years, allowing 72 to a degree; and these reckoned backward, as in the former case, will place the Argonautic expedition 43 years after the death of Solomon. Newton also employs other methods of a similar nature, and, by thus establishing this epoch, reduces the supposed age of the world about 500 years.

Historians and astronomers of different countries and ages employ various epochs in fixing the dates of the events they record. The creation of the world; the first Olympiad; the building of Rome; the era of Nabonassar; the birth of Christ; and

the flight of Mahomet, are the principal of these epochs.

Many ancient authors date the occurrence of events from the *Creation of the world;* but the opinions of the learned relative to this primitive event do not agree with each other. This uncertainty renders the Julian period highly advantageous as a general standard to which to refer the dates of other systems, and one by which all this difference of opinion is avoided. Notwithstanding the various opinions of the learned on this subject, it should be remarked that, according to some of the most esteemed biblical critics, the sacred scriptures assign 4004 years for the interval between the creation and the birth of Christ. It is therefore easy to reduce any date of the Christian era, or of any other era when its relation to this is known, to that of the creation of the world, by means of simple addition or subtraction.

The *Olympiads* were used by the Greek writers, as epochs to which they refer the recurrence of events. The commencement of every fourth year was the signal for the celebration of magnificent games in honour of Jupiter Olympus, at which all the states of Greece were assembled, near Olympia, a city of Peloponesus. These games were instituted by Iphitus, and the first year of the first Olympiad corresponds with the year 3938 of the Julian period, and consequently with the 776th year before the Christian era. This year was therefore the 18th of the solar cycle; the 5th of the lunar cycle; and the 8th of the cycle of indiction. From these data, any year indicated in Olympiads may easily be brought either to the Julian period, or the Christian era. If we take the second year of the 87th Olympiad, which is distinguished in the history of Greece by the commencement of the Peloponesian war, as an example, we have eighty-six complete Olympiads,

which multiplied by 4, is 344 years, to which the 2 being added, we have 346 years since the commencement of the first Olympiad; but as this corresponded with the 3938th year of the Julian period, if 345 be added to this last we have 4283 for the year required. To transfer the same event to the Christian era; as the first Olympiad was 776 years before that era, we have 776 — 345 = 431 years before the birth of Christ for the date required.

The *Founding of Rome* is the era at which the Latin writers commence their series of dates, and is therefore of general utility. According to Varro, this was the 21st of April 3961 of the Julian period, and 753 before the birth of Christ. Any year, therefore, dated according to this series, is easily brought to either the Julian or the Christian period, in the same manner as in the preceding example.

The *era of Nabonassor*, King of the Chaldeans, is another epoch celebrated for its astronomical observations; and for having been referred to by several ancient writers on scientific subjects, particularly Hipparchus and Ptolemy. The commencement of this era corresponds to the 26th of February, of the 3967th year of the Julian period; and consequently 747 years before the Christian era. Its commencement answers to the Egyptian month Thoth; and it was then that they began their year of 365 days.

The *Birth of Christ* is now the era adopted by all Christendom as the common point of time to which they refer the commencement of their series of dates. This is the most extensively used of any of the epochs that have been mentioned, and the dates of the one may readily be reduced to the other by means of the relations already specified.

The last era abovementioned is the *Hegira*, or the flight of Mahomet, from which the Arabs, Saracens, Turks, Tartars, and other Mahometan writers, commence their series of dates, and corresponds to

the 5835th year of the Julian period, and to the 622d of the Christian era. When an event is therefore known in any one of these systems, it is easy to reduce it to any other, by means of addition and subtraction only. Thus the present year would be expressed in the other series of dates by subtracting 622 for the Hegira, adding 753 for the era of the foundation of Rome, and 4004 for the creation. The respective dates of the present time, according to these systems, would then be 1196, 2571, and 5822.

The Naturalist's Diary

For JULY 1819.

Deep to the root
Of vegetation parched, the cleaving fields
And slipp'ry lawn an arid hue disclose;
Echo no more returns the cheerful sound
Of sharp'ning scythe; the mower, sinking, heaps
O'er him the humid hay, with flowers perfumed.

THOMSON.

In consequence of the excessive heat usual in this month, an evaporation takes place from the surface of the earth and waters, and large clouds are formed, which pour down their watery stores, and deluge the country with floods, frequently laying the full-grown corn. Hay-making usually commences about this time, or rather earlier, in fine seasons.

The flowers which blossomed in the last month soon mature their seeds, and hasten to decay. A new race succeeds, which demands all the fervid rays of a solstitial sun to bring it to perfection. *Summer* may be said to commence with this month: the meadows begin to whiten, and the flowers that adorn them are mowed down. The *corn* gradually assumes a yellow hue, and the colours that decorate the rural scene are no longer so numerous.[1]

[1] See the principal parts of a Summer's day poetically described in our last volume, pp. 177-180.

Towards the middle of the month, the spiked willow (*spiræa salicifolia*), jessamine (*jasminum officinale*), hyssop (*hyssopus officinalis*), the bell-flower (*campanula*), and the white lily, have their flowers full blown. The wayfaring tree, or guelder rose, begins to enrich the hedges with its bright red berries, which in time turn black. The Virginian sumach (*rhus typhinum*) now exhibits its scarlet tufts of flowers upon its bright green circles of leaves. The berries of the mountain ash turn red. The lavender (*lavendula spica*) is in flower, and affords its perfumes, whether in a fresh state, or dried, or distilled with spirits of wine. This valuable plant, for it is valuable in medicine as well as on account of its smell, will flourish in soils where other plants will not. We have heard of a piece of chalk land, of about thirty acres, in Berkshire, near Henley upon Thames, that had been tried with various articles, and would not produce any thing. At length it was planted with *lavender*, which succeeded beyond expectation, and the produce is sold yearly to a perfumer, who distils it upon the spot, and gives upon an average about five hundred pounds for the crop.

The potatoe (*solanum tuberosum*) is now in flower. See our last volume, p. 180.

The different tribes of *insects*, which, for the most part, are hatched in the spring, are now in full vigour.

Pomona now offers her fruits to allay the parching thirst; currants, gooseberries, raspberries, strawberries, cherries, and cranberries, are all peculiarly refreshing at this season.

Towards the end of the month, the flowers of the laurustinus (*viburnum tinus*), and the burdock (*arctium lappa*), begin to open; and the elecampane (*inula helenium*), the amaranth (*amaranthus caudatus*), the great water plantain (*alisma plantago*), water mint (*mentha aquatica*), and the common nightshade, have their flowers full blown.

The mezereon (*daphne mezereon*), which in Janu-

ary cheered the eye with its rods of purple flowers without leaves, and regaled the smell, now displays its scarlet berries through its bright green leaves.

Young frogs leave their ponds, and resort to the tall grass for shelter; swallows and martins congregate previously to their departure; young partridges are found among the corn; and poultry moult. The hoary beetle (*scarabæus solstitialis*) makes its appearance; bees begin to expel and kill drones; and the flying ants quit their nests.

The 'busy bee' still pursues his ceaseless task of collecting his varied sweets to form the honey for his destroyer *man*, who, in a month or two, will close the labours of this industrious insect by the suffocating fumes of brimstone. For poetical illustrations, see our last volume, pp. 216, 303.

Grouse-shooting usually *commences* towards the latter end of this month. The *angler* is busily engaged in his favourite pursuit. On *trout* fishing we give the following pretty descriptive lines from *Mickle's Syr Martyn*, a modern poem 'disguised with antique semblance.'

——When atop the hoary western hill,
The ruddie Sun appears to rest his chin,
When not a breeze disturbs the murmuring rill,
And mildlie warm the falling dewes begin,
The gamesome *Trout* then shows her silverie skin,
As wantonly beneath the wave she glides,
Watching the buzzing flies, that never blin,
Then, dropt with pearle and golde, displays her sides,
While she with frequent leape the ruffled streame divides.

On the green bank a truant schoolboy stands;
Well has this urchin markt her mery play,
And ashen rod obeys his guileful hands,
And leads the mimick fly across her way;
Askaunce, with listly look and coy delay,
The hungrie Trout the glitteraund treachor eyes,
Semblant of life, with speckled wings so gay;
Then, slyly nibbling, prudish from it flies,
Till with a bouncing start she bites the truthless prize.

Ah, then the younker gives the fatefull twitch;
Struck with amaze she feels the hook ypright
Deepe in her gills, and, plonging where the beech

Shaddows the poole, she runs in dread affright;
In vain the deepest rocke her late delight,
In vain the sedgy nook for help she tries;
The laughing elfe now curbs, now aids her flight,
The more entangled still the more she flies,
And soon amid the grass the panting captive lies.

Where now, ah pity! where the sprightly play,
That wanton bounding, and exulting joy,
That lately welcomed the retourning ray,
When by the riv'let's banks, with blushes coy,
April walked forth—ah! never more to toy
In purling streams, she pants, she gasps and dies

Another author has thus elegantly described the making of the 'mimic fly.'

To frame the little animal,—provide
All the gay hues that wait on female pride:
Let nature guide thee: sometimes golden wire
The shining bellies of the fly require;
The *peacock's* plumes thy tackle must not fail,
Nor the dear purchase of the *sable's* tail;
Each gaudy *bird* some slender tribute brings,
And lends the growing *insect* proper wings:
Silks of all colours must their aid impart,
And every *fur* promote the fisher's art.
So the gay lady with expensive care
Borrows the pride of land, of sea, of air,
Furs, pearls, plumes, the glittering thing displays,
Dazzles our eyes, and easy hearts betrays.

The *maritime plants* which flower in July, are the club rush (*scirpus maritimus*), bearded cat's tail grass (*phleum crinitum*), bulbous fox tail grass (*alopecurus bulbosus*), the reflexed and creeping meadow grass (*poa distans & maritima*), the field eryngo (*eryngium campestre*), parsley water dropwort (*œnanthe pimpinelloides*), smooth sea-heath (*frankenia lævis*), and the golden dock (*rumex maritimus*); all of which are to be found in salt marshes.

On *sandy shores* may be seen the sea mat-weed (*arundo arenaria*), upright sea-lime grass (*elymus arenarius*), the sea lungwort (*pulmonaria maritima*), the sea bind-weed (*convolvulus soldanella*), saltwort (*salsola*), sea-holly (*eryngium maritimum*): prickly

samphire (*echinophora spinosa*), and the sea-lavender (*statice limonium*), are found on maritime rocks; and the sea pea (*pisum maritimum*) on rocky shores.

About the middle or latter end of July, pilchards (*clupea pilchardus*) appear in vast shoals, off the Cornish coast; and prawns and lobsters are taken in this month.

The storms of wind and rain in this month are frequently accompanied by *thunder* and *lightning* [1]. The circumstances of a storm in summer are very grand and awful. The day is commonly very sultry, the thermometer perhaps at 86, the sky exhibits a sort of copper glow, and a solemn silence prevails. The lightning begins to dart its forked fires in a zig-zag direction, or the clouds opening disclose it in tremendous sheets; the thunder roars at intervals, or keeps up a continued rumbling. The clouds now may assume a deep and gloomy blue, intermixed with others of grey; a few large heat drops fall at first, and are succeeded by a heavy shower falling in dark oblique lines. A fire-ball, perhaps, descends, and sets some stack or barn into a blaze of fire, or trees are riven asunder by the forked lightning [2]. The terrors of a storm are heightened by the wildness and ruggedness of the surrounding scenery.

> High on the east the great *Ben Lawond* rears
> His lofty head, and hides it in the clouds!
> These, oft attracted by his tow'ring height,
> Stop short their airy flight, and form a veil
> Which dark and thick descends. Condensing still,
> Part slowly sails along, and, swelling, shrouds
> The neighb'ring hills—the glens how dark between!
> The winds are hushed—the birds expectant pause!
> The ox with wistful gaze eyes the deep gloom!
> Nor voice of man is heard, nor pipe nor horn,
> But silent expectation reigns and boding fear!

[1] For some useful hints to guard against the danger of these phenomena, consult T.T. for 1817, p. 217.

[2] See our last volume, p. 185, for a beautiful little poem on this subject by Mrs. Carter.

Sudden athwart the gloom the lightning's glance,
As quick reflected by the placid lake,
With lucid air darts bright! Anon sublime
In awful majesty the thunder rolls;
Onward it rolls, and louder roars,
In bursting peals successive heard afar,
Re-echoed oft by rocks and caverns deep
From all the neighb'ring hills—till circling round,
Still gaining force, again it bursts a peal
That stuns the ear. Rocks dashed on rocks are heard
Rending around. The stoutest heart, appalled
With wild dismay, scarce dares to eye the gloom:
Deep seamed with frequent streaks of moving fire,
Darting in rapid gleams from cloud to cloud!
The clouds are seen in wildest tumults mixed:
And now—a mighty flash with fearful glare
Wide opens half the sky! The heavy rain,
Pouring in streams, resistless rushes down,
Ploughs the red mould, and bears it to the main!
Nature convulsed, the everlasting hills
Appear to totter, and the total wreck
Of all terrestrial objects seems at hand!

DR. CHIRIE.

OBSERVATIONS *on the* MICROSCOPE.

[Concluded from p. 180.]

If decayed *cheese* be examined by the microscope, it will be seen to swarm with a multitude of small transparent animals, of an oval figure, terminating in a point, something in the form of a snout. These insects are furnished with eight scaly articulated legs, by means of which they move themselves very heavily along. Their head is terminated by an obtuse body, in the form of a truncated cone, where the organ through which they feed is apparently situated. The greater part of their bodies is covered with several long sharp-pointed hairs. It is found that there are another kind of mites that have only six legs: they are all extremely tenacious of life; for, Leeuwenhoek says, that some of them which he had attached to a pin before his microscope, lived in that state several weeks.

Nothing can be more curious than the appearance exhibited by *mouldiness*, when viewed through a microscope. If looked at by the naked eye, it seems nothing but an irregular tissue of filaments; but the magnifying glass shows it to be a forest of small plants, which derive their nourishment from the moist substance which serves them as a base. The stems of these plants may be plainly distinguished; and sometimes their buds, some shut and some open. They have much similarity to mushrooms, the tops of which, when they come to maturity, emit an exceedingly fine dust, which is their seed. Mushrooms, it is well known, are the growth of a single night, but those in miniature, of which we are speaking, seem to come to perfection in a much less space of time than that; hence we account for the extraordinary progress which mouldiness makes in a few hours. Another curious observation of the same kind is, that M. Ahlefeld, seeing some stones covered with a sort of dust, had the curiosity to examine it with a microscope, and he found that it consisted of small microscopic mushrooms, raised on pedicles, the heads of which, round the middle, were turned up at the edges. They were striated also from the centre to the circumference, as certain kinds of mushrooms are. He further remarked, that they contained, above their upper covering, a multitude of small grains, shaped like cherries, somewhat flattened, which he suspected were the seeds; and finally he observed, among this forest of mushrooms, several small red insects, which probably fed upon them.

The *lycoperdon*, or puff-ball, is a plant of the fungus kind, which grows in the form of a tubercle, covered with small grains, very like shagreen. If pressed, it bursts, and emits an exceedingly fine kind of dust, which flies off under the appearance of smoke. If some of the dust be examined with the microscope, it appears to consist of perfectly round globules, of an orange colour, the diameter of which is only about

the $\frac{1}{50}$th part of the thickness of a hair, so that each grain of this dust is but the $\frac{1}{2500}$th part of a globule, equal in diameter to the breadth of a hair.

The *farina of flowers* is found to be regularly and uniformly organized in each kind of plant. In the mallow, for example, each grain is an opaque ball, covered over with small points. The farina of the tulip, and of most of the liliaceous kind of flowers, bears a striking resemblance to the seeds of the cucumber: that of the poppy is very like grains of barley, with a longitudinal groove in them.

There are certain plants, the leaves of which seem to be pierced with a multitude of small holes. Of this kind is the *hypericum*, or St. John's wort. Now, if a fragment of this be viewed with a good microscope, the supposed holes are found to be vesicles, contained in the thickness of the leaf, and covered with an exceedingly thin membrane; and these are thought to be the receptacles which contain the essential and aromatic oil peculiar to the plant.

The view exhibited by those plants which have down, such as borage, nettles, &c. is exceedingly curious. When examined by a microscope, they appear to be covered with spikes. Those of borage are, for the most part, bent so as to form an elbow; and though really very close, they appear, by the microscope, to be at a considerable distance from each other. The entire appearance is very similar to that of the skin of a porcupine.

If a *needle* be viewed through a microscope, though exceedingly fine, the point will appear quite blunt, more like a peg, broken at the end, than a sharp-pointed steel needle. The edge of the finest set razor, when seen through a microscope, will appear more like the back of a penknife, full of irregularities, than what it really is. In these respects, the works of art, when carried to the highest pitch of perfection, will not bear to be compared with the operations of nature. The latter, exposed to the microscope,

instead of losing their lustre and high polish, appear so much the more beautiful and perfect in regularity and order. When the eyes of a fly are illuminated by means of a lamp or candle, and viewed through this instrument, each of them shows an image of the taper with a precision and vivacity which nothing can equal.

There are two kinds of *sand*, viz. the calcareous and the vitrifiable: the former, examined with a microscope, resemble large irregular fragments of rock; but the latter appear like so many rough diamonds. In some instances, the particles of sand seem to be highly polished and brilliant, like an assemblage of diamonds, rubies, and emeralds.

Charcoal is a fine object for the microscope: it is found to be full of pores, regularly arranged, and passing through its whole length.

—

Cut down your hie medowes whiles wether is faire,
The knots of your fruite trees laie naked and bare:
Thrust sickle in some part of your hard corne,
But first let the moneth be well nigh outworne.
Walke warely I will thee,
For ill smelles may kill thee.

July God sende thee calme and fayre,
That happy haruest we may see:
With quyet tyme, and healthsome ayre,
And man to God may thankful bee.

—

DESCRIPTION OF FRUIT TREES.

[Continued from p. 165.]

PEAR TREE *(pyrus communis)*.—This fruit tree grows to a considerable height, with upright branches, but the twigs or smaller branches hang down. The leaves are oval, pointed, and serrated or sawn at the edges. The younger leaves have a downy substance underneath, and also along the edges. The *wild* pear tree, from which all the orchard and garden varieties are produced, is thorny. Pear trees

are propagated by budding or grafting them upon stocks of their own kind, which are commonly called *free* stocks; or upon quince stocks, or white thorn, upon all of which they will readily take; though the quince stocks are generally preferred, as they check the luxuriant growth of the pear tree, and greatly improve the flavour of the fruit. They should be planted in a strong soil, but never in dry or gravelly ground. The pear tree is of the same genus as the *apple;* and although the latter has long obtained a decided preference, still the usefulness of the pear tree and the excellence of the fruit are deservedly noticed by the elegant poet, who condescended to celebrate the superior virtues of its rival-relative:—

> 'What though the pear tree rival not the worth
> Of Ariconian products? yet her freight
> Is not contemned, yet her wide-spreading arms
> Best skreen thy mansion from the fervent dog
> Adverse to life; the wintry hurricanes
> In vain employ their roar, her trunk unmoved
> Breaks the strong onset, and controls their rage.
> Chiefly the *bosbury*, whose large increase
> Annual in sumptuous banquets claims applause,
> Thrice acceptable beverage!———
> Be it thy choice, when summer heats annoy,
> To sit beneath her leafy canopy
> Quaffing rich liquids! Oh! how sweet t'enjoy
> At once her fruits and hospitable shade.!

The numerous sorts of this fruit now grown in our orchards have been accidentally raised from seed, and are generally distinguished by the size and flavour of the fruit. The following are the best and the most remarkable:—The little musk pear, or the *supreme,* which is generally produced in large clusters. This fruit is rather round than long, and has a short stalk. The skin is yellow when ripe, and the juice has a musky flavour; but it will only continue good for a few days, and should always be gathered before it becomes very ripe. The red *Muscadelle* is a large early pear of great beauty; the skin is of a beautful yellow, striped with red, and the flesh

has a rich flavour. This sometimes produces two crops in a year; the first about the end of July, and the second in September. The *Windsor* pear has a smooth skin, and when ripe is of a yellowish-green colour; the flesh is very soft, and if permitted to hang two or three days after it is ripe, grows mealy, and becomes good for nothing. It ripens in the latter part of August. The *Jargonelle* is something like the Windsor pear; it has a smooth pale green-coloured skin. It is a plentiful bearer, especially on standards, but if suffered to ripen on the tree it is liable to become mealy. It ripens in the middle of August. The *Orange Musk* pear is of a yellow colour spotted with black: the flesh is musky, but very apt to be deficient in juice. The *Perfumed* pear is of a deep red colour spotted with brown; the flesh is melting, but dry, and has a perfumed flavour. It ripens in the beginning of September. The *Rose-water* pear has a rough skin, and is of a brown colour; the juice is very sweet, and tastes like rose-water. It ripens in the latter end of September. The *Great Mouth-water* pear is well known for melting away into juice; it ripens about the latter end of September. The summer *Bergamot*, which is often called Hampden's bergamot, is distinguished by its melting flesh and highly perfumed juice. It ripens about the latter end of September. The autumn bergamot is smaller, but has the same good qualities, and is a great bearer, ripening in the beginning of October. The red *butter* pear has a very melting flesh, and is full of a rich sugary juice. It ripens in October, and when first gathered from the tree is one of the very best pears that this country affords. The white and grey *Monsieur John* pear are the same, the difference in their colour arising from the different soils and situations in which they grow, or the stocks on which they are grafted. The flesh is full of a rich sugared juice. It ripens at the end of October or beginning

of November, and when well managed produces the best sort of pears that can be procured at that season.

The flowered *Muscat* is an excellent pear, with a very tender and delicate flavoured flesh. It ripens in November. The *Vine* pear is of a dark red colour; the flesh is very melting, and full of a clammy juice. It comes into eating in November. When the *Marquis* pear changes yellow in ripening, it will be tender and delicate, and very full of a sugared juice. When it does not turn yellow, it is seldom good. It ripens in November. The *Louisbon* or Good Lewis pear has an extremely tender flesh, full of a very sweet juice; it comes into eating about Christmas. The *Colmar* pear is very tender, and the juice greatly sugared. It is in eating about the beginning of January, and is esteemed an excellent fruit. The *St. Germain* pear is a fine fruit, and keeps well; the flesh is melting, and very full of juice, which in a dry season, or if planted in a warm soil, is very sweet: it is in eating from December to January. The *St. Austin:* this pear is rather full of juice, which is often rather acid; the flesh is tender, but not buttery. It is in eating at the latter end of December, and will continue good two months. The flesh of the winter *Russelet* is buttery and melting, and generally full of a sweet juice: this is ripe at the end of January. The brown *Beurré* is of a reddish brown colour on the side next the sun, and yellowish on the other side. The flesh is melting and full of a rich juice: it ripens in October, and is deservedly esteemed.

The winter *Bonchrêtien* pear is very large: the flesh is tender, and very full of a rich sugared juice. It is in eating from the end of March till June. The *German muscat* is an excellent pear; it is buttery and tender, and has a highly flavoured juice: the time of eating it is from February till April or May. The brown St. *Germain* is a very

fine highly-flavoured pear on dwarfs and standards, and comes in after the St. Germain. It continues in eating from December till the end of March. The *Swan's egg* is a middle sized pear, shaped like an egg; it is of a green colour thinly covered with brown; the flesh is melting, and full of a pleasant musky juice. It is ripe in November. The tree is healthy and bears well, either as a standard, or in any other way. The pear called *Bergamot de pasque* is also called the Terling, the Amoselle, the Paddington, and the Tarquin. It is a fine handsome fruit, of a green colour when gathered, and of a yellowish or straw colour when ripe; it comes into eating about the month of April, continues till June, and makes a very handsome appearance at table. The *Golden Beurré* is a very fine pear, of a beautiful scarlet colour next the sun, and of a gold colour on the other side; the flesh is melting, and the juice highly-flavoured; it is a plentiful bearer, and will grow best in an eastern aspect and upon a loamy soil. The *Lansac*, or Dauphiny pear, is generally about the size of a Bergamot; of a roundish figure, flat towards the head; the skin is smooth and of a yellowish green colour; the flesh is yellow, tender, and melting; the juice is sugared and a little perfumed; the eye and flower are very large, and the stalk is long and straight. When this pear is upon a free stock, and planted on a good soil, it is one of the best fruits of the season; but when it is on a quince stock, or upon a very dry soil, the fruit will be small, stony, and worth little: it ripens at the end of November. There are many other sorts of pears which might be here mentioned, but those above described are the most worthy of notice, and, therefore, we shall only add the *Saint Martial*, which is sometimes called the *Angelic* pear. It is shaped like the Bonchrêtien, but is flatter at the crown, and not so large; the stalk is long; the skin smooth and yellowish, but turning purple next to the sun; the flesh

is tender and buttery, and the juice very sweet; it is in eating in February and March.

From the above description it will be easy for every person to select such sorts as will be agreeable to their palates; and the time at which they ripen being exhibited, it will be easy to know when to apply for each particular sort. The liquor called *perry*, which is made from pears, as cyder is from apples, by means of fermentation, is a wholesome beverage. The best pears for making it are those which are so excessively tart that even pigs will not eat them readily. The Bosbury, the Bareland, and the Horse pear are most esteemed in Worcestershire, and the Squash pear[1] in Gloucestershire. In grinding, the pulp and rind of the pear, like that of the apple in cyder-making, should be perfectly reduced. The managing the liquor during the process of fermentation is nearly the same. The juices of both fruits contain the same component parts in different proportions. The liquor is fined by isinglass, but, if it can be refined without it, the best judges think it will retain more of its genuine flavour, which resembles wine. On the whole, the *pear* furnishes a less popular beverage than the apple, but the tree is capable of being grown on a greater variety of soil, and is more productive. The pear tree is a native of Europe, was familiar to the antients, and has long

[1] The *squash pear*, so called from the tenderness of its pulp, has probably furnished England with more *Champaigne* than was ever imported into it.

Some cyders have by art or age unlearned
Their genuine relish, and of sundry vines
Assumed the flavour: one sort counterfeits
The *Spanish* product; this to *Gauls* has seemed
The sparkling nectar of *Champaigne*; with that
A *German* oft' has swilled his throat, and sworn,
Deluded, that imperial *Rhine* bestowed
The gen'rous rummer; whilst the owner, pleased,
Laughs inly at his guests thus entertained
With foreign vintage from his cider cask. PHILIPS.

been a great favourite with the French. The *wood* is light, smooth, and compact; it is used by turners; also for joiners' tools, and for picture frames to be stained black. The leaves yield a yellow dye, and will give a green tinge to blue cloths.

AUGUST.

SEXTILIS was the antient Roman name of this month, being the sixth from March. The Emperor Augustus changed this name, and gave it his own, because in this month Cæsar Augustus took possession of his first consulship, celebrated three triumphs, reduced Egypt under the power of the Roman people, and put an end to all civil wars. 'The Saxons called August *arn-monat* (more rightly *barn-monat*), intending thereby the then filling of their barnes with corne.'

Remarkable Days

In AUGUST 1819.

1.—LAMMAS DAY.

THIS day, in the Romish church, is generally called *St. Peter in the Fetters*, in commemoration of this apostle's imprisonment. It is probably derived from an old Saxon term, signifying *Loaf-Mass;* as it was customary for the Saxons to offer an oblation of loaves, made of new wheat, on this day, as the first-fruits of their new corn.

*4. 1808.—JOHN HOME DIED, ÆT. 82,

Author of the Tragedy of *Douglas*, a work of the highest merit, if we may judge from the circumstance, that it is the only tragedy since Addison's Cato which has become a 'stock-piece' upon the stage.

*5. 1786.—JONAS HANWAY DIED,

Well known for his various and extensive charities. A circumstance which gives him a peculiar claim to a place in a work treating of the seasons and

weather is, that to him we owe the introduction into Britain of that most useful article, the UMBRELLA. He had seen it, in his travels in Persia, used as a defence against the burning rays of the Sun, and, converting it into a protection from the rain, was generally *mobbed* as he walked on a wet day through the streets of London. Now the poorest cottager frequently can boast the possession of a convenience, at that time an object of universal curiosity and wonder—a lesson this, not to be deterred from the introduction or adoption of any thing really useful, by the idle laugh of the ignorant and thoughtless.

6.—TRANSFIGURATION.

Though this day was observed in remembrance of our Lord's *Transfiguration* on the Mount, by the primitive Christians, yet it is but of recent date in the church of Rome; as it was not instituted by Pope Calixtus until the year 1455.

7.—NAME OF JESUS.

Before the Reformation, this day was dedicated to *Afra*, a woman who had been converted to Christianity by Narcissus, Bishop of Jerusalem, and who afterwards suffered martyrdom; and the breviary was recognized by Paul V. Afterwards Donatus, who became a martyr in the time of Julian for refusing to sacrifice, was substituted in her place. Our reformers devoted it to the NAME OF OUR BLESSED LORD.

10.—SAINT LAWRENCE.

St. Lawrence was, by birth, a Spaniard, and treasurer of the church of Rome, being deacon to Pope Sextus, about the year 259. Soon afterwards, his bishop was killed by the soldiers of Valerian the emperor, with whom our saint would willingly have died. Lawrence refusing to deliver up the church treasure, which they imagined to be in his custody, he was laid upon a gridiron, and broiled over a fire. The celebrated palace of the Escurial is dedicated to

this saint. See this described in T.F. for 1814, p. 199.

12. 1762.—PRINCE REGENT BORN.

*12. 1817.—THOMAS SHERIDAN DIED,

The only son of the celebrated Richard Brinsley Sheridan. He early entered the army, and Lord Moira, then commander-in-chief in Scotland, appointed him one of his *aides-de-camp*. Having contracted the habit of keeping bad hours, the noble Earl exposed the impropriety of such conduct in the following very gentle but most effectual way. In the capacity of aide-de-camp, the young man resided in the splendid mansion of his patron; and one evening his lordship purposely, sending all the servants to bed, sat up himself till four or five in the morning, when Mr. Sheridan, who happened to be the junior officer on his staff, returned in *high spirits* from a ball. He was not permitted to knock long, for his illustrious commander obeyed the first summons with the utmost promptitude, and, going down with a couple of candles, ceremoniously lighted the astonished subaltern to his bed-chamber!

15.—ASSUMPTION.

This is a festival in the Greek and Romish churches, in honour of the supposed miraculous ascension of the Virgin Mary into heaven.

*18. 1812.—WOODLAND CONVERTED INTO WATER.

After a long continued draught at Giessen, in the circle of the Upper Rhine, the following curious phenomena commenced upon this day. A piece of woody ground, comprising twelve English acres, suddenly sank about five feet; on the 20th it fell two feet more; on the 24th it sunk another foot; and continued giving way almost imperceptibly, until, by the 4th of September, it had descended 15 feet. This frightful chasm remained near a week, and was visited by thousands. On the 12th, the surface of the land became marshy; since which water was ob-

served to rise, and by the 19th it had entirely filled the vacuity, and presented a level sheet of water.

*21. 1762.—LADY M. W. MONTAGUE DIED, ÆT. 72.

To this justly celebrated lady we owe something more than the entertainment we receive from her elegant 'Letters, written during her Travels in Europe, Asia, and Africa'; a benefit to all Europe, no less important than that of *Inoculation for the Small Pox*, having been conveyed by her from the Turkish dominions. She examined into this practice with such attention, during her residence at Constantinople, as to become perfectly satisfied of its efficacy, and gave the most intrepid and convincing proof of her belief, in 1717, by inoculating her son, then about three years old. In 1722, after her return to England, she repeated the experiment upon a daughter of the age of six years, who was afterwards Countess of Bute. The children of the Royal Family, that had not had the small-pox, shortly underwent the same operation with success; then followed some of the nobility; and the practice thus gradually prevailing among all ranks (notwithstanding it had to encounter very strong prejudices), was soon extended to Scotland, and to most parts of Europe.

Lady M. W. Montague was undoubtedly a woman of extraordinary talents, and acquired the honours of literary reputation at a time when they were not bestowed on the undeserving. It is, however, but right to add, that the moral tendency of her Letters may be justly questioned; many of the descriptions of Eastern luxuries and beauty are such as can scarcely be tolerated in an age of decency, and a prudent guardian will hesitate long before he can admit the 'Letters from Constantinople' among books fit for the perusal of the young.

*22. 1571.—BISHOP JEWEL DIED.

Holy Learning, Sacred Arts,
Gifts of Nature, Strength of Parts,
Fluent Grace, an Humble Mind,
Worth reformed, and Wit refined,

Sweetness both in Tongue and Pen,
Insight both in Books and Men,
Hopes in Woe, and Fears in Weal,
Humble Knowledge, Sprightly Zeal,
A Lib'ral Heart, and free from Gall,
Close to Friend, and True to All,
Height of Courage in Truth's Duel;
Are the Stones that made this JEWEL.
Let him that would be truly Blest,
Wear this JEWEL in his Breast.

Worthies of Devon.

*23. 1628.—DUKE OF BUCKINGHAM ASSASSINATED.

Sir Simonds D'Ewes, in a manuscript life of himself, gives the following account of this remarkable transaction:—'August the 23d, being Saturday, the duke having eaten his breakfast between eight and nine o'clock in the morning, in one Mr. Mason's house in Portsmouth, he was then hasting away to the king, who lay at Reswicke, about five miles distant, to have some speedy conference with him. Being come to the farther part of the entry leading out of the parlour into the hall of the house, he had there some conference with Sir Thomas Frier, a colonel; and stooping down in taking his leave of him, John Felton, gentleman, having watched his opportunity, thrust a long knife, with a white helft, he had secretly about him, with great strength and violence, into his breast, under his left pap, cutting the diaphragma and lungs, and piercing the very heart itself. The duke having received the stroke, and instantly clapping his right hand on his sword-hilt, cried out, "God's wounds! the villain hath killed me."

'Some report his last words otherwise, little differing in substance from these; and it might have been wished that his end had not been so sudden, nor his last words mixed with so impious an expression. He was attended by many noblemen and leaders, yet none could see to prevent the stroke. His Duchess, and the Countess of Anglesey (the wife of Christopher Villiers, Earl of Anglesey, his younger brother), being in an upper room, and hearing a noise in the hall, into which they had carried the duke, ran pre-

sently into a gallery, that looked down into it, and there beholding the duke's blood gush out abundantly from his breast, nose, and mouth (with which his speech, after those his first words, had been immediately stopped), they brake into pitiful outcries, and raised great lamentation.

'He pulled out the knife himself; and being carried by his servants unto the table, that stood in the same hall, having struggled with death near upon a quarter of an hour, at length he gave up the ghost, about ten o'clock, and lay a long time after he was dead upon the table.'

24.—SAINT BARTHOLOMEW.

The word Bartholomew means the son of Tolmai, or Tolomæus, the name of a family among the Jews, mentioned by Josephus. He preached the Gospel in Armenia, converted the Lycaonians, and afterwards visited India. Some authors assert that he was crucified, like St. Peter, with his head downwards; others, however, with more probability, say, that he was flayed alive, by order of Astyages, King of Armenia.

*25. 1760.—CITY GATES SOLD.

The materials of the three following City Gates were sold on this day, before the committee of lands, to a Mr. Blagdon, a carpenter in Coleman-street: Aldgate for £157 10*s*; Cripplegate £91; Ludgate £148. The purchaser engaged to commence the removal of the two first on the 1st of September, and Ludgate on the 4th; and to clear away all the rubbish, &c., in two months from those days.

28.—SAINT AUGUSTINE.

Augustine was born at Thagaste, a town in Numidia, in the year 354. He early applied himself to the study of polite literature, and became a professor of philosophy and rhetoric, first at Rome, and afterwards at Milan. He next diligently studied theology, in which he was instructed by St. Ambrose, with whom he contracted an intimate acquaintance.

In the year 388, he returned to his native country, and, three years afterwards, was chosen Bishop of Hippo. Augustine was a judicious divine, and the most voluminous writer of all the Fathers. He died in 430, at the age of 77.

29.—JOHN BAPTIST BEHEADED.

This day was formerly denominated *Festum Collectionis Sancti Johannis Baptistæ;* or the feast of gathering up St. John the Baptist's relics; but afterwards, by corruption, *Festum Decollationis*, the festival in remembrance of his being beheaded. His nativity is celebrated on the 24th of June, which see; and also T.T. for 1817, p. 164, for some lines on St. John, by Cottle.

Astronomical Occurrences

In AUGUST 1819.

THE Sun enters Virgo at 15m. after 1 in the morning of the 24th of this month; and he rises and sets as in the following Table, during the same period.

TABLE

Of the Sun's Rising and Setting for every fifth Day.

August 1,	Sun rises	20	m. after	4.	Sets	40	m. after	7
6,	- - -	27	- -	4	-	33	- - -	7
11,	- - -	35	- -	4	-	25	- - -	7
16,	- - -	44	- -	4	-	16	- - -	7
21,	- - -	53	- -	4	-	7	- - -	7
26,	- - -	2	- -	5	-	58	- - -	6
31,	- - -	12	- -	5	-	48	- - -	6

Equation of Time.

To the time as indicated by a good sun-dial, add the quantity in the following Table answering to the given day; and it will give the time that ought to be shown by a well regulated clock at the same moment.

TABLE.

			m.	*s.*
Sunday	- August 1st,	to the time by the dial *add*	6	1
Friday - - - - - -	6th,	- - - - - - - - - - -	5	58
Wednesday - - -	11th,	- - - - - - - - - - -	5	0
Monday - - - - -	16th,	- - - - - - - - - - -	4	8
‘urday - - - - -	21st,	- - - - - - - - - - -	3	10
‘ay - - - -	26th,	- - - - - - - - - - -	1	48
- - - - -	31st,	- - - - - - - - - - -	0	21

Phases of the Moon.

Full Moon	-	5th day,	at	57 m.	after	9 evening.
Last Quarter		12th,	- - -	13	- -	6 - - -
New Moon	-	20th,	- - -	13	- -	9 - - -
First Quarter		28th,	- - -	27	- -	3 afternoon.

Moon's Passage over the Meridian.

If the weather be favourable, the Moon may be observed to pass the first meridian at the following times during this month: viz.

August 1st,	at	53 m.	after	7	in the	evening.
2d,	-	56	- - -	8	- - - - -	
3d,	-	2	- - -	10	- - - - -	
4th,	-	8	- - -	11	- - - - -	
22d,	-	24	- - -	4	in the	morning.
23d,	-	12	- - -	5	- - - - -	
24th,	-	0	- - -	6	- - - - -	
25th,	-	51	- - -	6	- - - - -	
30th,	-	50	- - -	7	in the	evening.
31st,	-	55	- - -	8	- - - - -	

Phase of Venus.

August 1st	Enlightened part - - - - -	11·36727	digits.
	Dark part - - - - - - - -	0·63273	- - -

Eclipses of Jupiter's Satellites.

The following are the eclipses of Jupiter's first and second satellites, which are visible at the Royal Observatory during this month: viz.

IMMERSIONS.

1st Satellite	3d day	at	5 m.	after	2 morning.
	12th,	- -	45	- -	0 - - -
	20th,	- -	9	- -	9 evening.
	27th,	- -	4	- -	11 night.

EMERSIONS.

2d Satellite	10th day	at	40 m.	past	11 night.
	18th,	- -	15	- -	2 morning.

Other Phenomena.

Mercury will attain his greatest elongation on the 10th of this month, and appear stationary on the 24th. Jupiter will be in opposition at 15 m. past 2 in the afternoon of the 5th. The Moon will be in conjunction with Saturn at 47 m. after 2 in the morn-

ing of the 9th; with β in Taurus at 29 m. past 7 in the morning of the 15th; with Pollux, at 2 m. after 8 in the evening of the 17th; and with α in Scorpio, at 23 m. after 8 in the evening of the 28th.

On the EFFECTS *of* GRAVITATION.

When the powers of reason, borne on the wings of science, launch into the boundless regions of physical research, the mind is soon convinced that Infinite Wisdom has placed first principles entirely beyond its grasp, and submitted only the laws by which they act to its investigation. By the former, he has opposed an effectual barrier to the arrogant curiosity of the perverted mind; and, by the latter, afforded unlimited scope for the exercise and progressive improvement of the intellectual faculties of the human mind. This sentiment applies with peculiar force to the subject of gravitation, the *cause* of which has hitherto eluded the most daring flights of genius; while its phenomena have constantly arrested the attention and excited the admiration of the students of nature in all ages of the world.

By *gravitation*, philosophers understand that power of attraction which every particle of matter exerts upon every other particle at finite distances from each other. As bodies, whatever their nature and magnitude may be, are only aggregated particles, the same attraction takes place proportionally between them; and gravitation, therefore, becomes the most universal law of the material world. It is by this power that bodies retain their forms; that the component parts of the earth and the other planets are not dissipated in the boundless regions of space; that terrestrial bodies, when unsupported, descend to the earth; that the planets and their satellites are retained in their orbits; and that the solar system itself maintains its place in the universe. This is the elevated mount to which the philosopher is conducted by the phenomena of nature. It is this point

on which he takes his stand, and is enabled not only to explain present appearances, but to predict the future situations of the heavenly bodies with an accuracy which appears little less than miraculous, to those who are unacquainted with this great law of the material world. To some persons, indeed, it seems as if the Deity had unveiled the secrets by which he governs the universe. Only the *effects* of this power, however, are perceptible to our senses, while the Great Agent which produces them, and thus, as it were, gives life and motion to inanimate beings, is an invisible principle.

On considering the influence of this invisible and powerful agent, the mind is immediately struck with the imperfection of physical knowledge prior to the moment when NEWTON, in one of his contemplative modes, was roused from his reverie by the falling of an apple,—a fact which had been exhibited for thousands of years, and might have been for ever observed by ordinary minds, without leading to any important conclusion. But when the genius of Newton was once brought to bear upon this point, that which for ages had been impenetrable became less impervious, till, by a chain of reasoning, as simple as it was accurate, he laid the magnificent scene of nature open to our view, and unveiled the law by which not only atoms but worlds are combined into one harmonious whole.

All the phenomena of attraction, as far as they have yet been the subjects of observation, or comprehended by the human mind, unite in proving that this power is exercised by every particle of matter, and that the law which regulates its intensity is that of the inverse square of the distance, or, in other terms, the attractive power with which any body acts upon another is *directly* as its mass and *inversely* as the square of its distance: thus if F denote the force of attraction, M the mass or quantity of matter in

any body, and D its distance from any other body; and if f, m, and d, denote the same for any other body, we have

$$F \text{ as } \frac{M}{D^2} \text{ and } f \text{ as } \frac{m}{d^2};$$

and consequently

$$F : f :: \frac{M}{D^2} : \frac{m}{d^2}.$$

From this general proportion, the ratio of either the masses or the distances of bodies is easily found in terms of each other; for by multiplying by D^2 and d^2, we have

$$M : m :: FD^2 : fd^2.$$

And again, by dividing the terms of this last proportion by F and f, and taking the square roots of the quotients, we shall also have

$$D : d :: \sqrt{\frac{M}{F}} : \sqrt{\frac{m}{f}}.$$

Astronomers and philosophers have demonstrated this law from the following considerations:—1. By observing and comparing the effects of gravity at the top and bottom of mountains; 2. By the descent of bodies near the surface of the Earth compared with that of the Moon in her orbit in the same time; 3. By the comparison of the arcs described in the same time by all the planets revolving round the Sun, and the satellites about their primaries; 4. By the ratio of the squares of the times of the planetary revolutions to the cubes of their mean distances; 5. By the constant ratio between the areas described by the radius vector of each planet and the times of their description; 6. By the motions of the planets in elliptical orbits, and by the direction of gravity towards one of the foci of the ellipse. As the nature of our work necessarily precludes us from exhibiting the proofs themselves from which this great law is derived, we

have thus briefly enumerated the sources from which they are drawn.

As the gravity of any body is only the aggregate attraction of all its particles, it is easy to conceive that there is a point within each body into which the whole attractive force of that body may be supposed to be concentrated, without producing any variation in the general and aggregate effect of that attraction; and this centre of attraction, under all general circumstances, is coincident with the centre of the mass, or centre of gravity of the body. By thus conceiving the attractions of two bodies to be reduced to those of two physical points, not only the investigations of all the problems into which such considerations enter, but all the conclusions drawn from such investigations, are greatly simplified; as by this means the precise places of these bodies are ascertained; the exact distance between them determined; and the indefinite number of forces, acting in different directions, are all reduced to two, acting in the same right line, and directly opposed to each other.

As the Earth contains an incomparably greater quantity of matter than any of the other bodies immediately in its vicinity, the attractive forces of all these are wholly destroyed by that of the terraqueous globe, and each body descends towards its centre by the difference of its attraction and that of the Earth. This difference is denominated *terrestrial gravitation*, or, more generally and simply, *gravity*. It is not, however, intended by this term either to indicate the nature of gravity, or to assign its cause, but merely to mark the direction of its tendency.

This direction is always towards a point which is near the centre of the Earth; or, more strictly speaking, that direction is always in lines perpendicular to the surface of the Earth, at the points where they would penetrate it. Bodies do not therefore descend in lines that are strictly parallel to each other; but

as the spaces through which we can observe their descents are so extremely small compared with the distances of these bodies from the centre of attraction, these lines, or the tendencies of the bodies when at rest, and at small horizontal distances from each other, are always considered as parallel in physical researches; a consideration which simplifies the inquiry without sensibly affecting the accuracy of the result. Thus the action of two weights suspended from the extremities of a lever, and keeping it in equilibrio, are regarded as acting at right angles to the axis of that lever; and consequently the directions of their tendencies as being parallel to each other. A similar observation may also be made relative to the intensity of this force; for though this intensity varies inversely as the square of the distance from the attracting body, the spaces through which the descents of bodies can be observed are so small with respect to the terrestrial radius, that, considering the power of gravity as constant for those small spaces, can seldom, in any practical case, lead to an error in the result of an hundred thousandth part of the whole. For the Earth's radius being about 4000 miles, the force of gravity at its surface will be to that force at $\frac{1}{50}$ of a mile, or 105$\frac{6}{8}$ feet above it, as

$$(4000\tfrac{1}{50})^2 : (4000)^2 :: 1 : \left(\frac{4000}{4000.02}\right)^2$$

$$= \left(\frac{200000}{200001}\right)^2 = .99999;$$

and hence

$$1 - .99999 = .00001 =$$

the difference between the force of gravity at the Earth's surface and at this elevation above it.

Now as the spaces are as the forces, and a heavy body near the surface of the Earth falls through a space equal to 16$\frac{1}{12}$ feet, or 193 inches in the first se-

cond of its descent, it would fall through 192·99807 inches at the height of 105¾ feet above the surface.

We shall therefore have 193 — 192·99807 = ·00193 of an inch for the difference of the spaces fallen through in the first second at these heights; and consequently this difference, expressed in terms of the whole space, will be ·00001. The force of gravity may, therefore, be regarded as constant, at least the difference for any heights at which we can make experiments is altogether insensible in the results, as the error would not exceed $\frac{1}{10}$ of an inch in a space of 830 feet.

It is fully proved by experience, that all bodies, when perfectly at liberty to obey the action of gravity, fall equally swift, independent of the resistance of the medium through which they move; as a feather and a piece of gold in the exhausted receiver of an air-pump descend through the same space in the same time; and as this descent is not influenced by the magnitude, shape, or texture of the body, it proves that the effect of gravity is always proportional to the mass or quantity of matter in the bodies upon which it acts. Experience also proves that when bodies freely descend by the influence of this agent, they receive equal accessions of velocity in equal times; from which it follows that the action of gravity is not merely constant, as it regards duration, but that its intensity is also constant, whether the bodies upon which it acts are at rest or in motion. Both these properties, therefore, distinguish it from mechanical causes, the action of which is always proportional either to the magnitude or surface of bodies, and produces, in the same time, a less acceleration in the velocities when the bodies are in motion in the direction of their action, than when they are at rest at the moment this action commences.

The effects produced by the action of terrestrial gravity, and which are the subjects of constant obser-

vution, may be arranged under two heads; first, as the bodies upon which its influence are to be considered are preserved at rest on the Earth's surface, or supported by any other means; or, secondly, as its effects are productive of either motion or change of motion. It is from effects of the first kind that bodies derive that tendency to descend, which we denominate weight; and without which the diurnal revolution of the Earth would cause them to be projected from its surface with velocities proportional to their respective situations. The velocity of those at the equator would exceed fifteen hundred feet per second; and, for other situations, the velocities would be proportional to the squares of the cosines of the latitude.

The same power preserves the ocean within its proper boundaries; for by its action in directions every where perpendicular to the surface of the waters, they are caused to assume a globular form, and that general equilibrium between all parts of their mass is established, by which their characteristic sphericity is preserved, amidst all the varying causes by which they are perpetually agitated: and gravity thus becomes the perpetual fulfiller of that command which said to the mighty ocean, '*Hitherto shalt thou go, but no further.*' It is the *direction* of this force, also, from whence we derive our ideas of upwards and downwards; the former of which is opposed to the tendency of its action, and the latter coincides with it; and, consequently, our notions relative to the inhabitants of distant regions of the globe being differently situated in this respect from ourselves, are mere prejudices, originating in our own limited views of the subject.

[To be continued.]

The Naturalist's Diary

For AUGUST 1819.

'While the Earth remaineth, seed-time and harvest shall not fail.'

Hail, cheering words!—hearken, ye suffering poor,
To Heaven's decree,—long as this Earth remains,
Seed time and harvest ne'er again shall fail!
Away desponding thoughts—each doubt avaunt.
What, though the waving crops languish and droop;
Although the clouds obscure the solar rays,
Still, long as nature's God remains and rules,
Bids every season in succession roll,
Through darkness veils his purpose from your view,
Still shall YOUR FOOD BE GIVEN, and NOT FAIL.
With patience, trust in His almighty power,
Whose potent word hath altered nature's laws.
To save his people from misfortune's power,
He fed them with rich Manna from the Skies!

THE powerful influence of the solar rays now contributes to ripen the various sorts of grain, which are benevolently given for the food of man and cattle. Fine weather is very desirable, that the principal source of the farmer's wealth may be safely housed; for sudden storms beat down the nearly ripened corn, and materially injure it. The utmost diligence is now exerted, and labourers from all parts are eagerly engaged to give their assistance in this delightful occupation; all is bustle and activity.

Poured from the villages, a numerous train
Now spreads o'er all the fields. In formed array,
The reapers move; nor shrink for heat or toil.
By emulation urged: others dispersed,
Or bind in sheaves, or load, or guide the wain,
That tinkles as it passes. Far behind
Old age and infancy with careful hand
Pick up each straggling ear.

The various kinds of wheat are described in our last volume, p. 209. To these we may add the *Talavera*, which may be sown with equal success in spring as in autumn.

JOHN BARLEYCORN, *a Ballad.*

There went three kings into the east,
Three kings both great and high,
And they hae sworn a solemn oath
John Barleycorn should die.

They took a plough and ploughed him down,
Put clods upon his head,
And they hae sworn a solemn oath
John Barleycorn was dead.

But the cheerful SPRING cam kindly on,
And show'rs began to fall;
John Barleycorn got up again,
And sore surprised them all.

The sultry suns of SUMMER came,
And he grew thick and strong,
His head well armed wi' pointed spears,
That no one should him wrong.

The sober AUTUMN entered mild,
When he grew wan and pale;
His bending joints and drooping head
Showed he began to fail.

His colour sickened more and more,
He faded into age;
And then his enemies began
To show their deadly rage.

They've ta'en a weapon, long and sharp,
And cut him by the knee;
Then tied him fast upon a cart,
Like a rogue for forgerie.

They laid him down upon his back,
And cudgelled him full sore;
They hung him up before the storm,
And turned him o'er and o'er.

They filled up a darksome pit
With water to the brim,
They heaved in John Barleycorn,
There let him sink or swim.

They laid him out upon the floor,
To work him farther woe,
And still, as signs of life appeared,
They tossed him to and fro.

They wasted, o'er a scorching flame,
The marrow of his bones;
But a Miller used him worst of all,
For he crushed him between twa stanes.

And they hae ta'en his very heart's blood,
And drunk it round and round;
And still the more and more they drank,
Their joy did more abound.

John Barleycorn was a hero bold,
Of noble enterprise,
For if you do but taste his blood,
'Twill make your courage rise.

'Twill make a man forget his woe;
'Twill heighten all his joy;
'Twill make the widow's heart to sing,
Tho' the tear were in her eye.

Then let us toast John Barleycorn,
Each man a glass in hand;
And may his great posterity
Ne'er fail in old Scotland! BURNS.

About the 11th of August, the puffin *(alca arctica)* migrates. Priestholme, or Puffin's Island, about three quarters of a mile from the Isle of Anglesea, abounds with these birds; and their flocks, for multitude, may be compared to swarms of bees.

In the middle of the month, the *swift* disappears, and probably migrates to more southern regions. Rooks begin to roost in their nest trees, and young broods of goldfinches (*fringilla carduelis*) appear; lapwings (*tringa vanellus*) and linnets (*fringilla linota*) congregate; the nuthatch chatters; and, towards the end of the month, the redbreast is again heard.

At the beginning of August, melilot (*trifolium officinale*), rue (*ruta graveolens*), the water parsnip (*sysimbrium nasturtium*), horehound (*marrubium vulgare*), water-mint (*mentha aquatica*), the orpine (*sedum telephium*), and the *gentiana amarella*, have their flowers full blown. The purple blossoms of the meadow saffron (*colchicum autumnale*) now adorn the low moist lands. The number of plants in flower, however, is greatly lessened in August, those which bloomed in the former months running fast to seed. Yet, we are continually reminded of the bounty of our Creator; though the *flowers of spring* and the

lovely *rose*[1] are no more, the *fruits* of summer and of autumn now pour in their abundant stores.

> The sunny wall
> Presents the downy *Peach*, the shining *Plum*,
> The ruddy fragrant *Nectarine*, and dark,
> Beneath his ample leaf, the luscious *Fig;*
> The *Vine* too, here, her curling tendrils shoots,
> Hangs out her clusters, glowing, to the south,
> And scarcely wishes for a warmer sky.
>
> THOMSON.

Heaths and commons are now in all their beauty; the flowers of the various species of heath (*erica*) covering them with a fine purple hue. Ferns also begin to flower, the commonest sort of which is the fern or brakes (*polypodium filix-mas*); but the female (*pteris aquilina*) is the most beautiful plant.

Insects still continue to swarm; they sport in the sun from flower to flower, from fruit to fruit, and subsist themselves upon the superfluities of nature.

It is not the *air* only that abounds with insects at this season; *ditches* and stagnant *pools of water* are equally prolific of them. One of those most commonly found in these haunts, is the *monoculus apus*, and is an excellent subject for the microscope. Some account of an examination of one by the aid of this powerful instrument will be found in T.T. for 1817, p. 242; see also pp. 156, 183, of the present volume.

That beautiful little insect, the *lady-bird*, or lady-cow, now seen, and so often charged with being the cause of blights in apple-trees, is in reality the best remedy against that disease. When perfect, and in its larva state, it feeds entirely upon the *aphis*, a genus of which the blight in question is a species. The

[1] The morning *Rose* that untouched stands,
Armed with its briars, how sweet it smiles!
But plucked and stained by ruder hands,
Its sweet no longer with it dwells;
But scent and beauty both are gone,
And leaves fall from it one by one.

utility of this insect, in destroying the blight, is well known in the hop-countries.

To the LADY-BIRD.

Oh! Lady-bird, Lady-bird, why dost thou roam
So far from thy comrades, so distant from home?
Why dost thou, who can revel all day in the air,
Who the sweets of the grove and the garden can share,
In the fold of a leaf, who can form thee a bower,
And a palace enjoy in the tube of a flower;
Ah, why, simple Lady-bird, why dost thou venture
The dwellings of man so familiar to enter?
Too soon you may find that your trust is misplaced,
When by some cruel child you are wantonly chased;
And your bright scarlet coat, so bespotted with black,
May be torn by his barbarous hands from your back.
And your smooth jetty corselet be pierced with a pin,
That the urchin may see you in agonies spin;
For his bosom is shut against pity's appeals,
He has never been taught that a Lady-bird feels.
Ah, then you'll regret you were tempted to rove
From the tall climbing hop, or the hazel's thick grove
And will fondly remember each arbour and tree,
Where lately you wandered contented and free;
Then fly, simple Lady-bird!—fly away home,
No more from your nest and your children to roam.'

The harvest-bug (*acarus ricinus*), in this and the following month, proves a very troublesome and disagreeable insect; particularly in some of the southern counties of England. The best cure for the bite is *hartshorn*. Flies now abound, and torment both men and animals with their perpetual buzzing. Wasps and hornets become, in this and the succeeding month, very annoying to us in our rural walks.

The common *glow-worm*, 'the little planet of the rural scene,' may be observed in abundance in the month of August, when the earth is almost as thickly spangled with them as the cope of heaven is with stars.

The solitary bee (*apis manicata*), and the white moth (*phalæna pacta*), are observed in this month:

[1] Smith's Conversations on Natural History, vol. i, p. 10.

the *ptinus pectinicornis* also makes its appearance. The larvæ of this insect are very destructive to wooden furniture, boring holes in tables, chairs, bed-posts, &c.;—they are much inclined to lay their eggs in beech, hence this wood is less fit for the manufacture of domestic utensils. If their eggs are deposited on the surface, frequent rubbing will preserve wooden furniture.

The southern counties of England, particularly Surrey and Kent, now yield their valuable produce of *hops* in this month. The common hop (*humulus lupulus*) is propagated either by nursery plants, or by cuttings.

The heat of this month is sometimes excessive; and regarding coolness and freshness as indispensable to the enjoyment of Nature's bounties at this season, those who are confined in large cities luxuriate themselves with the 'frequent ice,' and employ every means in their power to cool the various liquors, which the heat renders necessary to relieve the 'parched and fevered lip' of thirst. See T.T. for 1818, p. 211, for some observations on *cooling liquors*, and p. 25 of our present volume, on the construction of an ice-house.

Towards the end of the month, the wild orach (*chenopodium album*), the wild clary (*salvia verbenaca*), the sweet gale (*myrica gale*), the golden rod (*senecio paludosus*), the milk-thistle (*carduus marianus*), and ladies-traces (*ophrys spiralis*), have their flowers in full bloom.

Several *maritime* plants flower this month;—glasswort (*salicornia herbacea*), the grass-wrack (*zostera marina*), on sea-coasts; the samphire (*crithmum maritimum*), and the *asparagus officinalis*, among *rocks*. On *sandy shores* may be seen the sea campion, or catchfly (*silene maritima*), sea spurge (*euphorbia paralia*), and lavender cotton (*santolina maritima*). On *sea shores* are found the sea-stock (*cheiranthus sinuatus*), and sea wormwood (*artemisia maritima*).

In this, and the succeeding month, much knowledge may be gained of marine plants, shells, &c. &c. by those who visit the sea-coast. The healthful amusement of wandering over the sands or beach, and among the caverns of our sea-girt isle, may easily be rendered improving to the mind, as well as the body, by bringing us acquainted with the great Author of Nature, in the *apparently* most insignificant, but wonder-fraught, works of his almighty hand. See an interesting narrative of the examination of some shell-fish *(echini marini)* in T.T. for 1817, p. 250.

The best *live shells* are collected by means of a trawling-net, such as are used by fishermen, if the depths will permit; they are also brought up by the cable in weighing anchor, and the log-line in sounding. After a storm, good shells may be picked up on the sea beaches, or shores, as the violent agitation of the water in a tempest separates them from their native beds, and often casts them on the shore; but such as have been exposed for some time to the heat of the sun, or beaten by the waves, are of little value, as their colours will be faded, and the shells worn and broken: choose, therefore, always such shells as lie in the deepest parts of their resorts and under water, whether taken up by the drag-net, from the sides of rocks, or bottoms of ships, &c. Pilchards are taken in great quantities in this month.

—

Reape downe your rie, and shocke up your wheate,
Your summer-fruites gather, the sweeter to eate;
And downe with such otes as God shall you send,
Provided this moneth drawe toward an end.
Burning heate may annoy thee,
Quaking cold may destroy thee.

Reclayme your haukes, and man them so,
As they no tyme your call neglect;
And for a partridge, plume the crow,
Or gadde (lyke kytes) at every checke.

—

In our last year's Diary for August (F.T. for 1818, p. 215) will be found an '*Inscription for the Banks of a Stream*;' as a suitable companion to it we now insert the following beautiful 'poetical *description of the progress of a river, from its source to the sea.*' As it is intended (observes the author[1]) to be descriptive only of scenes that may be supposed to be familiar to an English eye, it takes no notice of the thundering cataracts, golden sands, and other objects of savage climes; nor will it be considered, perhaps, as defective, in not containing a single allusion to river-gods and water-nymphs, or to any of the trite machinery of antient fiction.

Behold the riv'let, from its parent-source,
Steal through the thicket with unheeded course;
Of future greatness yet unconscious stray,
Like infant princes, in their infant play;
O'er its rough bed in lulling murmurs flow,
Or through the breezy sedge meand'ring slow.
And now in waves, impelling-soft, it roves
Through sunny banks, or deep-involving groves;
From sister-streams receives enriching aid,
And wonders at the progress it has made.
Now tufty isles the doubtful stream divide,
The sacred haunts of Cygnus' plumy pride:
O'er the clear crystal hangs the woody scene,
The weeping *willow*, or bright *evergreen*.
The trembling branches, all inverted, seem
To point to other skies below the stream.
The sun reflected gilds th' illusive deep,
Or shadowing winds the mantling surface sweep.
Here thick'ning grass invites the mower's scythe,
The busy groups of men and maidens blithe;
Here the shorn meadow brightens to the eye;
The scattered herds lie ruminating nigh:
Each rising charm the bounteous stream bestows,
The grass that thickens, and the flower that blows.
And while the vale the humid wealth imbibes,
The fost'ring wave sustains the finny tribes;
The *carp*, with golden scales, in wanton play;
The *trout*, in crimson-speckled glory gay;

[1] The late Mr. Lobb, the elegant writer of the 'Contemplative Philosopher,' 12mo, 2 vols.

The red-finned *roach*, the silver coated *eel*,
The *pike*, whose haunt the twisted roots conceal;
The healing *tench*, the *gudgeon*, *pearch*, and *bream*,
And all the sportive natives of the stream.
The vig'rous stream now drives the busy mill,
And now disdains the little name of *rill*.
The clust'ring cots adorn its flow'ry sides,
Where blest Content, with rosy Health, abides.
Or here the villa's simple charms invite,
Where rural ease and elegance unite.
There, gaudy Art her cumb'rous pomp displays,
Where gay Caprice bedecks the verdant maze;
The palace, column, temple, statue, rears;
While Nature fashionably drest appears,
And now the bridge, by busy mortals trod,
High over-arches the ambitious flood.
Now crowded cities, lofty turrets rise,
And smoking columns mingle with the skies;
Where the rash youth their limbs exulting lave;
Where oars innum'rous beat th' astonished wave.
On the proud surface swells th' impatient sail,
And gladdened coasts the welcome streamers hail.
Expanding still the rough'ning waters glide,
In haste to mingle with the briny tide[1];
Till sea-like grown, they now disdain all bound,
And, rushing to the deep, resistless pour around.

DESCRIPTION OF FRUIT TREES.

[Continued from p. 192.]

PLUM TREE (*prunus domestica*).—This is generally a middling sized tree, growing to the height of fifteen or twenty feet, and branching out into a spreading head. It delights in a lofty exposure, and is not injurious to pastures where it has been planted. The cultivated garden plums are all derived from this species. The garden and orchard kinds are very numerous, differing in the form, taste, colour, and substance of the fruit. The following are the most remarkable:—The White *Primordian*, a small yellow-coloured mealy plum, ripens in the latter end of July or beginning of August; a single tree of this

[1] Ove nei falsi flutti
Il bel Tamigi amareggiando intoppa. ARIOSTO.

sort will be sufficient for a common sized garden. The *Morocco*, which is a middle sized plum, has good flesh, and ripens about the beginning of August. The Little Black Damask or *Damson*, is covered with a light violet bloom; the juice is richly sugared; the flesh parts from the stone, and the tree is a good bearer. The *Orleans* plum is well known, and is planted generally, because it bears plentifully, by those who supply our markets with fruit; but is, in fact, an inferior kind of plum. The *Egg* plum is a large oval-shaped fruit, of a yellowish colour, powdered over with a delicate white bloom; the pulp is firm, and adheres closely to the stone; the juice is of an acid taste, which renders it unpleasant to be eaten raw, though it is very good for baking or converting into a sweetmeat: it is a great bearer, and the fruit ripens in the middle of September.

The *Apricot* plum is a large round yellow-coloured fruit, powdered over with a white bloom; the pulp is firm and dry, sweet tasted, comes clean from the stone, and ripens at the end of September. The *Dauphiness* plum, a name generally confounded with that of the Green Gage: there are three or four different sorts sold for it, but they are all inferior; it is one of the best plums in England, and is produced in large quantities. The *Royal* plum is a large fruit of an oval shape, drawing to a point next the stalk; the outside is of a light red colour, powdered over with a whitish bloom; the flesh adheres to the stone, and has a fine sugary juice; it ripens in the middle of September. The *Cherry* plum is generally about the size of the Oxheart Cherry, round and red; the blossoms come out very early in the spring, at the same time as those of the almond, and, when intermixed with the latter, present a most beautiful spectacle. The *Muscle* plum is not much esteemed, hence the tree is principally used for stocks. The *Green Gage*

is the finest eating plum we have; it ripens in August: the best are tinged with purple.

We must now notice the *Bullace* tree, which is another of the same genus; it grows twelve or fifteen feet high, with thorny branches; it varies with black and wax-coloured fruit, and with some that is red, and has a bitter unpleasant taste, growing in the hedges of Essex and Suffolk: the acid of this esteemed fruit is so tempered by sweetness and roughness as not to be unpleasant, especially after it is mellowed by frost: a conserve is prepared by mixing the pulp with thrice its weight of sugar; an infusion of the flowers, sweetened with sugar, is also often given as a mild aperient for children. The Black Thorn, or *Sloe* tree, is one of the same genus as all the rest of the plum kind; it is a crooked shrub, growing about six feet high; but the fruit is so sharp and austere, that it requires the severe action of frost to mellow and render it eatable, and it then becomes an agreeable variety. Of all these various sorts of the plum kind, it may be remarked, that when eaten in small quantities and in a ripe state, they are not unwholesome; but when taken in large quantities, and especially if unripe, they are very deleterious. In a medicinal point of view they are considered as emollient and cooling, especially the *French prunes* or dried plums imported from Marseilles, which are the most wholesome of all the dried fruits. The smallness of all these trees renders their wood of little value except for fuel.

SEPTEMBER.

SEPTEMBER is composed of *septem*, seven, and the termination *ber*, like *lis* in *Aprilis, Quintilis, Sextilis*. This rule will also apply to the three following months, Octo-ber, Novem-ber, Decem-ber. Our Saxon ancestors called it *Gerst-monat*, 'for that bar-

ley which that moneth commonly yeelded, was antiently called gerst.'

Remarkable Days

In SEPTEMBER 1819.

1.—SAINT GILES.

GILES, or Ægidius, was born at Athens, but, after he had disposed of his patrimony in charitable uses, came to France in the year 715. He lived two years with Cæsarius, Bishop of Arles, and afterwards retired into solitude.

*1. 1729.—SIR RICHARD STEELE DIED.

To him we owe the origin of that most useful and entertaining branch of literature, Periodical Publications. His 'Tatler,' the first number of which appeared April 12, 1709, was the parent not only of the Spectator and Guardian, but of all those other numerous and excellent works upon the same plan, which so much improved the taste and morals of that and succeeding generations. To Sir Richard Steele, also, we have great obligations as a dramatic writer. His Conscious Lovers, divested of its indelicacy, is one of the most interesting and amusing comedies in the English language.

2.—LONDON BURNT.

The fire of London broke out on Sunday morning, September 2d, 1666, O.S.; and being impelled by strong winds, raged with irresistible fury nearly four days and nights; nor was it entirely mastered till the fifth morning after it began. This most destructive conflagration commenced at the house of one Farryner, a baker, in Pudding-lane, near [New] Fish-street Hill, and within ten houses of Thames-street, into which it spread in a few hours; nearly the whole of the contiguous buildings being of timber, lath, and plaster, and the whole neighbourhood presenting little else than closely confined passages and narrow alleys. The fire quickly spread, and was not to be

conquered by any human means. For an interesting account of the fire, written by an eye-witness, see T. T. for 1816, p. 249-258.

7.—SAINT EUNERCHUS.

Eunerchus, or Evortius, was Bishop of Orleans, and present at the council of Valentia, A.D. 375. The circumstances of his election to this see were considered as miraculous, and principally ascribed to a dove, which alighted upon his head in consequence of the prayers of the electors.

8.—NATIVITY OF THE VIRGIN MARY.

A concert of angels having being heard in the air to solemnize this important event, the festival was appointed by Pope Servius about the year 695. Innocent IV. honoured this feast with an octave in 1244, and Gregory XI. about the year 1370, with a vigil.

*8. 1656.—BISHOP HALL DIED, ÆT. 82.

A prelate, who, being cast upon the evil days of Charles I, suffered much from the persecutions of the rebellious parliament. Some notion of their proceedings, upon the passing of the ordinance for sequestering 'notorious delinquents,' in April 1643, he being then Bishop of Norwich, may be formed from his own brief account.

'The sequestrators sent certain men appointed by them (whereof one had been burned in the hand) to appraise all the goods that were in my house; which they accordingly executed with all diligent severity, not leaving so much as a dozen of trenchers, or my children's pictures out of their curious inventory: yea, they would have apprized our very wearing-apparel, had not some of them declared their opinion to the contrary. These goods, both library and household stuff of all kinds, were appointed to be exposed to public sale; but, in the meantime, Mrs. Goodwin, a religious good gentlewoman, whom yet we had never known nor seen, being moved with compassion, very kindly offered to lay down to the sequestrators

the whole sum at which the goods were valued, and was pleased to leave them in our hands, for our use, till we might be able to re-purchase them. As for the books, several stationers looked on them, but were not forward to buy. At last, Mr. Cooke, a worthy divine of this diocese, gave bond to the sequestrators, to pay them the whole sum whereat they were set, which was afterwards satisfied out of that poor pittance which was allowed me for my maintenance.'

As a moralist, Bishop Hall has been entitled the Christian Seneca: his knowledge of the world, depth of thought, and elegance of expression, place him nearer our own times than many of his contemporaries; while he adorned his age by learning, piety, and the uniform exercise of all the Christian graces. It would, indeed, be difficult to name a prelate of more excellent character, or one, of his time, whose talents and sufferings, whose zeal in prosperity, and courage in adversity, deserve more honourable mention. His 'Meditations' have been often reprinted; and his entire works have lately been collected in a very handsome, correct, and well-arranged edition, in 10 vols. 8vo, by the Rev. Josias Pratt.

14.—HOLY CROSS.

This festival was first observed in the year 615, on the following occasion: Cosroes, King of Persia, having plundered Jerusalem, carried away large pieces of the cross which had been left there by the Empress Helena. Heraclius, the emperor, soon afterwards engaged and defeated him, and recovered the cross: but, bringing it back in triumph to Jerusalem, he found the gates shut against him, and heard a voice from heaven saying, that the *King of Kings* did not enter into that city in so stately a manner, but *meek and lowly, and riding upon an ass*. The emperor then immediately dismounted from his horse, and walked through the city barefooted, carrying the cross himself. The *holy-rood*, or cross, when perfectly made, had not only the image of our Saviour extended upon

it, but the figures of the Virgin Mary and St. John, one on each side; in allusion to John xix, 26,—*'Christ on the cross saw his mother, and the disciple whom he loved, standing by.'*

17.—SAINT LAMBERT.

Lambert was Bishop of Utrecht, in the time of King Pepin I; but, reproving the king's grandson for his irregularities, he was cruelly murdered at the instigation of an abandoned woman. Being canonized, he obtained, at first, only a simple commemoration in the calendar; but Robert, Bishop of Leeds, in a general chapter of the Cistercian order, procured a solemn feast to his honour in the church in 1240.

*18. 304.—ST. FERREOL BEHEADED.

The anniversary of this saint and martyr is celebrated at Marseilles with great pomp. The houses are decorated with streamers to the very tops; and the public way is crossed by cords, on which are suspended numberless flags of various colours. The ships are always ornamented with flags and streamers. The procession passes under several arches, hung with boughs, before it stops at the altars or resting-places, which are covered with flowers: every thing concurs to give to this solemnity an air of cheerfulness. The eye dwells with pleasure on the garlands of beautiful flowers, the green boughs, and the emblem of the Divinity, contained in the flags of the procession. The attendants are extremely numerous; every gardener carries his wax taper, ornamented with the most rare and beautiful flowers; he has also the vegetables and fruits with which heaven had blessed his labour, and sometimes he bears some nests of birds.

The *butchers* also make a part of this procession, clothed in long tunics, and with a hat *à la Henri IV*, armed with a hatchet or cleaver; they lead a fat ox dressed with garlands and ribands, and with gilt horns, like the ox at the carnival: his back is cover-

ed with a carpet, on which sits a pretty child, dressed as St. John the Baptist. During the whole week which precedes the festival, the butchers lead about this animal: they first take him to the police, where they pay a duty, and then their collection begins, which is very productive: every one wishes to have the animal in his house; and it is a prevailing superstition among the people, that they shall have good luck throughout the year if this beast leave any trace of his visit, however dirty it may be. The ox is killed on the day after the festival. The child generally lives but a short time: exhausted by the fatigue which he has suffered, and by the caresses which he has received, and sickened by the sweetmeats with which he has been crammed, he languishes, and often falls a victim.

A number of young girls, clothed in white, their heads covered with veils, adorned with flowers, and girded with ribands of a uniform colour, are next in the procession. Children, habited in different manners, recal the antient 'Mysteries.' Several young women are dressed as nuns; these are St. Ursula, St. Rosalia, St. Agnes, St. Teresa, &c. The handsomest are clothed as Magdalens; with their hair dishevelled on their lovely faces, they look with an air of contrition on a crucifix which they hold in the hand: others appear in the habit of the *Sœurs de la Charité*, whose whole time is devoted to the service of the sick. Young boys fill other parts, such as angels, abbots, monks: among whom may be distinguished St. Francis, St. Bruno, St. Anthony, &c. In the midst of the shepherds marches the little St. John, but half-covered with a sheep's-skin, like the picture of his precursor; he leads a lamb decked with ribands, a symbol of the Saviour who offered himself for us, and died for the remission of our sins. The streets are strewed with flowers; numerous choristers carry baskets full of roses and yellow broom, which they throw, on a given signal,

before the host or holy sacrament: they strew some of these on the ladies who sit in rows to see the procession; these also have baskets of flowers on their knees, which they offer to the host; they amuse themselves with covering the young virgins and little saints with the flowers. The sweet scents of the roses, the cassia, the jessamine, the orange, and the tuberose, mingled with the odour of the incense, almost overpower the senses. The procession proceeds to the port, and it is there that the ceremony presents a sublime character: the people fill the quays; all the decks are manned with seamen, dressed in their best blue jackets, their heads uncovered, and their red caps in their hands. All bend the knee to the God of the Universe: the seamen stretch out their hands towards the prelate, who, placed under a canopy, gives the benediction: the most profound silence reigns among this immense crowd. The benediction received, every one rises instantaneously; the bells begin to ring, the music plays, and the whole train takes the road to the temple from which they came. (See *Coxe's Gentleman's Guide through France*, p. 200.)

21.—SAINT MATTHEW.

In the year 64 or 65, Matthew wrote his Gospel in Hebrew, which was afterwards translated into Greek. After many labours and miracles, he closed his life at Nadabar in Ethiopia, probably by martyrdom.

22.—CORONATION OF KING GEORGE III.

His present Majesty was crowned on the 22d of September, 1761. The form of the oath, and the manner of taking it, may be seen in T. T. for 1814, p. 228-230.

*23. 1738.—DR. HERMAN BOERHAAVE DIED.

Linnæus, when at Leyden, had particularly wished to see and converse with Boerhaave, but in vain. No minister could be more overwhelmed with intreaties and invitations, nor more difficult in granting an audience, than Boerhaave. His menial servants reaped

advantages from this circumstance; for them an audience was always a profitable money-job; by the weight of gold it could alone be accomplished. Linnæus was quite unacquainted with this method, and had it not in his power to make presents. Owing to Boerhaave's infinite occupations, and the strict regularity which he observed, ambassadors, princes, and Peter the Great[1] himself, were obliged to wait several hours in his anti-chamber, to obtain an interview. How much more difficult must it have been for the young northern doctor, allowing him his usual spirit of liberality, to aspire at the honour of admittance! Notwithstanding all these obstacles, he accomplished it at last. He sent Boerhaave a copy of his newly published system. Eager to know the author of this work, who had likewise recommended himself by a letter, he appointed Linnæus to meet him on the day before his intended departure, at his villa, at the distance of a quarter of a league from Leyden, and charged Gronovius to give him notice of his intention. This villa contained a botanical garden, and one of the finest collections of exotics. Linnæus punctually attended to the invitation. Boerhaave, who was then sixty-seven years old, received him with gladness, and took him into his garden, for the purpose of judging of his knowledge. He showed him, as a rarity, the *Crategus Aria*, and asked him if he had ever seen that tree before, as it had never been described by any botanist. Linnæus answered that he had frequently met with it in Sweden, and that it had been already described by Vaillant. Struck with the young man's reply, Boerhaave denied the latter part of his assertion, with so much more confidence, as he had himself published Vaillant's work, with notes of his

[1] Boerhaave received visits from three crowned heads, the Grand Duke of Tuscany, William the Third, and Peter the Great, the last of whom slept in his barge all night, over against the house of the illustrious Professor, that he might have two hours' conversation with him before he began his lectures.

own, and firmly believed that tree had not been described in it. To remove all doubts, and to give all possible sanction to what he advanced, Boerhaave immediately produced the work itself from his library, and, to his extreme surprise, found the tree fully described in it, with all its distinctive marks. Admiring the exact and enlarged knowledge of Linnæus in botany, in which he seemed even to excel himself, the venerable old man advised him to remain in Holland, to make a fortune, which could not escape his talents. *(Stoever's Life of Linnæus.)*

Boerhaave was not more remarkable for the extent of his medical and philosophical knewledge, than for his sincere and humble piety: in proof of which, need only be noticed a common saying of his, that he never saw a criminal dragged to execution, without asking himself, 'Who knows whether this man is not less blamable than I am?'

26.—OLD HOLY ROOD. *See* HOLY CROSS, p. 220.

26.—SAINT CYPRIAN.

He was an African by birth, of a good family and well educated. He behaved with great courage and resolution in the Decian persecution, and openly invited the people to constancy and perseverance: this conduct so enraged the Pagans, that he soon fell a victim to their fury, and suffered martyrdom under Valerianus and Gallienus, in 258.

29.—SAINT MICHAEL.

Saint Michael was an archangel who presided over the Jewish nation, and had an army of angels under his command and conduct; he fought also with the Dragon or Satan, and his angels; and, contending with the Devil, he disputed about the body of Moses. See Rev. xii, 7; Jude 9. This festival has been kept with great solemnity ever since the sixth century. For customs on this day, see our former volumes.

30.—SAINT JEROME.

Jerome was born in a town called Stridon, on the confines of Pannonia and Dalmatia. He translated the Old Testament into Latin: this version, now

styled the *Vulgate*, is the only one used or allowed by the Romish church. He died in the 80th year of his age, A.D. 422.

Astronomical Occurrences

In SEPTEMBER 1819.

THE Sun enters Libra at 56 m. after 9 in the evening of the 23d of this month, and on the 19th of which he will be eclipsed, but the eclipse will be invisible in this country; and he will rise and set during the same period as in the following

TABLE

Of the Sun's Rising and Setting for every fifth Day.

September 1st, Sun rises	14	m. after	5.	Sets	46	m. past	6
6th,	- - -	24	- -	5	-	36	- -	6
11th,	- - -	34	- -	5	-	26	- -	6
16th,	- - -	43	- -	5	-	17	- -	6
21st,	- - -	52	- -	5	-	8	- -	6
26th,	- - -	2	- -	6	-	58	- -	5

Equation of Time.

If the numbers in the following table be applied, as directed, to the time shown by a good sun-dial, it will give that which should be shown at the same instant by a well regulated clock.

TABLE.			m.	s.
Wednesday, Sep. 1st,	to the time by the dial	*add*	0	3
Monday, - - - 6th,	from the time by the dial	*subtract*	1	34
Saturday, - - 11th,	- - - - - - - - - - - -		3	15
Thursday, - - 16th,	- - - - - - - - - - - -		5	0
Tuesday, - - - 21st,	- - - - - - - - - - - -		6	45
Sunday, - - - 26th,	- - - - - - - - - - - -		8	28

Phases of the Moon.

Full Moon,	-	4th day,	at	40	m. past	5	morning.
Last Quarter,	-	11th,	- -	58	- -	8	- - -
New Moon,	- -	19th,	- -	52	- -	12	- - -
First Quarter,	-	27th,	- -	3	- -	1	- - -

Moon's Passage over the first Meridian.

The Moon will pass the meridian of the Royal

Observatory at the following times, which will be convenient for observation, if the weather prove favourable: viz.

September	1st, at	57	m.	after	9	in the evening.				
	2d, -	56	-	-	10	-	-	-	-	
	3d, -	51	-	-	11	-	-	-	-	
	10th, -	59	-	-	4	in the morning.				
	11th, -	43	-	-	5	-	-	-	-	
	12th, -	36	-	-	6	-	-	-	-	
	13th, -	28	-	-	7	-	-	-	-	
	26th, -	50	-	-	5	in the evening.				
	27th, -	52	-	-	6	-	-	-	-	
	28th, -	54	-	-	7	-	-	-	-	
	29th, -	52	-	-	8	-	-	-	-	
	30th, -	47	-	-	9	-	-	-	-	

Phase of Venus.

Sep. 1st	Enlightened part - - - - - - - - -	11·8115 digits.
	Dark part - - - - - - - - - -	0·1885 - -

Eclipses of Jupiter's Satellites.

The eclipses of Jupiter's Satellites which will be visible at the Royal Observatory this month, will be the following: viz.

IMMERSIONS.

1st Satellite	4th	day, at	0	m.	after	1	morning.
	12th, -	-	24	-	-	9	evening.
	19th, -	-	20	-	-	11	- -
	26th, -	-	44	-	-	7	- -
2d Satellite	4th, -	-	43	-	-	8	- -
	11th, -	-	17	-	-	11	- -

Other Phenomena.

Mercury will be in his inferior conjunction at 4 in the morning of the 7th of this month, stationary on the 16th, and attain his greatest elongation on the 23d. Saturn will be in opposition at half past 4 in the morning of the 21st; and Georgium Sidus in quadrature at 7 in the morning of the 14th. The Moon will be in conjunction with β in Taurus at 35 m. after 2 in the afternoon of the 11th; with Pollux at 48 m. after 2 in the morning of the 14th; with Venus at 12 m. past 1 in the morning of the 19th; with Spica in Virgo at 4 m. after 2 in the

afternoon of the 21st; and with α in Scorpio, at 11 m. after 2 in the morning of the 25th.

On the EFFECTS *of* GRAVITATION.

[Continued from p. 206.]

When one body is supported by another, the force of gravity causes it to press upon its support; if it be suspended by a string, this string is extended by the action of gravity exerted upon the body. This tension is also found to be wholly independent of the figure of the body; but in different bodies of the same kind of matter, or of the same density, it is exactly proportional to their bulks, and, consequently, to the quantities of matter they contain. Weight, and body or mass, therefore, though not synonymous terms, are always proportional to each other, at the same distance from the centre of the Earth, or rather the centre of terrestrial attraction. This limitation is necessary; for when bodies are removed either to a greater or less distance from the centre, the body or mass remains the same, while the weight, being the effect of gravity, is variable; and, consequently, the weight can be substituted for the mass only, when the situation with respect to the centre of attraction is the same. Since, however, it is known that the force of gravity varies inversely as the square of the distance, and the effect is always proportional to the cause, the weight of a body may readily be found at any distance either above or below the Earth's surface, when its weight at the surface is known. For since the centre of attraction is either in or very near the centre of the Earth, if r denote the terrestrial radius, h the height of the body above its surface, and w its weight at that surface, we have

$$(r + h)^2 : r^2 :: w : \frac{r^2 w}{(r + h)^2} = w';$$

which expresses the effect of gravity, and, consequently, the weight of the body at the height h. If,

therefore, a body was found to weigh 100 lbs. on the shore of the Pacific Ocean, in the latitude of Chimborazo, and it was required to find its weight on the summit of that mountain, which is about 4 miles above the level of the sea; taking the radius of the Earth equal to 4000 miles, we shall have

$$w' = \frac{(4000)^2 \times 100}{(4004)^2} = \frac{1600000000}{16032016} =$$

$$99{\cdot}8003 \text{ lbs.} = 99 \text{ lbs. } 12{\cdot}8048 \text{ oz};$$

and hence the loss of weight in consequence of this elevation is 3·1952 ozs.

Again, if it were required to ascertain the height at which a body that weights w at the Earth's surface would weigh only w', we should have from the preceding expression, in which h becomes the unknown quantity,

$$(r + h)^2 w' = r^2 w,$$

therefore

$$(r + h)^2 = \frac{r^2 w}{w'};$$

and consequently

$$h = r\sqrt{\frac{w}{w'}} - r,$$

or, finally,

$$h = r\left(\sqrt{\frac{w}{w'}} - 1\right)$$

If, now, it were required to find at what height above the Earth's surface a body would lose one-fourth of its weight; by substituting these quantities in the preceding formula, we shall have

$$h = r(\sqrt{\tfrac{4}{3}} - 1) = r(\tfrac{2}{3}\sqrt{3} - 1);$$

hence

$$h = r\left(\frac{2 \times 1{\cdot}7320508}{3} - 1\right) = {\cdot}1543672r,$$

the height required. Consequently if $r = 4000$ miles

the height at which a body would lose $\frac{1}{4}$th of its weight at the Earth's surface is $\cdot 1543672 \times 4000 = 617{\cdot}4688$ miles.

The force of gravity does not vary in the same manner below the Earth's surface as above it; for, on the principle that every particle of matter possesses the property of attraction, mathematicians prove that, in descending from the surface towards the centre, gravity diminishes in the direct ratio in which the distance decreases. If, therefore, d denote the distance below the surface, and r, w, and w' as before, we shall have

$$r : r - d :: w : w',$$

and therefore

$$w' = \frac{(r-d)w}{r}.$$

Consequently, when r, d, and w are given, w' becomes known; or if w, w', and r are given, d is easily found; for

$$r - d = \frac{rw'}{w},$$

and consequently

$$d = r - \frac{rw'}{w}.$$

The next aspect in which the action of gravity on terrestrial bodies should be considered, is when these are at liberty to obey its influence, and consequently to descend in the direction in which that influence is exerted. The motion which is thus produced is found to agree in all its circumstances with that which mathematical investigation proves ought to result from the action of a constant force. The spaces through which bodies fall are always proportional to the squares of the times of their descent: if these times be 1, 2, 3, 4, &c. seconds, for instance, the spaces described are as 1, 4, 9, 16, &c. The space is also the same, whatever may be the magnitude of the body,

independently of the resistance which it experiences from the medium through which it moves; a circumstance which shows that the action of gravity is always proportional to the mass of matter, or the number of particles the body contains. In these descents also, the increments of velocity, and consequently the whole velocities, are found to be proportional to the times which the bodies have been in motion. Hence, when the space described, and the velocity acquired in any given unit of time, are ascertained, the space and velocity for any other time are easily determined, or the time corresponding to any other space or velocity found; and consequently all the circumstances and phenomena of bodies descending in perpendicular lines, or even down inclined planes, thence become known. It has been found that a falling body in the latitude of London, and independently of any resistance of the air, when urged by gravity, descends through 16 feet and an inch in the first second of its descent from rest, and acquires a velocity which would carry it through double that space, or 32 feet 2 inches, in the next second of time, if gravity ceased to act and the acquired velocity were uniformly continued during that period. For, as the velocities are proportional to the times, and the spaces as the squares of either, if any other time in seconds be denoted by t, the space by s, and the final velocity by v, and $g=16\frac{1}{12}$ feet, we have

$$1'' : t^2 :: g : gt^2=s,$$
$$\text{and} \quad 1 : t :: 2g : 2gt=v;$$

hence by finding the value of g and t in the last of these equations, and substituting them in the first, we shall have

$$s = gt^2 = \tfrac{1}{2}tv = \frac{v^2}{4g}.$$

By substituting the given numbers in these formulæ instead of their respective letters, the true

results in any particular question will be obtained.—If, for example, it were required to find the space through which a heavy body would descend in 3 seconds, then

$$s = gt^2 = 16\tfrac{1}{12} \times 9 = 144\tfrac{3}{4} \text{ feet},$$

the space required. And if the velocity at the end of the same time were required, by taking the second and third formulæ, we have

$$\tfrac{1}{2}tv = gt^2,$$

from which $v = 2gt = 32\tfrac{1}{6} \times 3 = 96\tfrac{1}{2}$ feet, the velocity required. The time either of describing a certain space or of acquiring a certain velocity may also be readily found: for if the time of falling through a space of 500 feet were required, we should have

$$t = \sqrt{\frac{s}{g}} = \sqrt{\frac{500}{16\frac{1}{12}}} = 10\sqrt{\frac{5}{16\frac{1}{12}}} = 10\sqrt{\frac{60}{193}}$$

$$= 5{\cdot}57567 \text{ seconds, the time required.}$$

The time of acquiring any given velocity may likewise be readily found; for let it be required to ascertain the time in which a body would acquire a velocity of 300 feet per second; then since

$$gt^2 = \tfrac{1}{2}tv,$$

we have

$$t = \frac{v}{2g} = \frac{300}{32\frac{1}{6}} = \frac{1800}{193} = 9{\cdot}32642 \text{ seconds.}$$

The same law applies equally to the ascent as to the descent of bodies, but in a contrary sense, that which is accelerating force in the one case becoming retarding force in the other. Thus, if a body were projected with a certain velocity in a direction perpendicular to the surface of the Earth at the point of projection, its motion would be opposed to the action of gravity, and the whole of its velocity would be destroyed by this force in exactly the same time as that in which it would have been generated in descending freely from a state of rest; and the same

space would be described in each case before the effect was produced.

When a body is projected in any direction not perpendicular to the horizon, another kind of effect is produced by the action of gravity. In this case, it deflects the body from the line of its projectile motion, and causes it to describe a curve, concave towards the earth. Thus, when the action of gravity is considered as acting in parallel lines, and the resistance of the medium through which the body moves is not taken into the account, the curve which is described by the combined effects of these two motions is a parabola, situated in the vertical plane passing through the centre of the earth and the line of its projectile motion. The effect of gravity upon a body thus projected is measured by the curvature of the line it describes, or the space through which it is caused to deviate in a given time from the line of its projectile motion, which constitutes the tangent to the first point of the curve.

A slight acquaintance with the phenomena of the physical world furnishes us with numerous examples of all these effects; and amply proves that the power which imparts weight to bodies, oscillation to the pendulum, and stability to the ocean, which accelerates the descent of bodies in perpendicular lines, and deflects them when projected obliquely, is strictly analogous to that which regulates the motions of the planetary system. It was the effect of this power upon a projectile that constituted, in the mind of the great investigator of the laws of gravitation, the first link of that chain which not only binds the earth to the heavens, but mutually connects all the bodies in our system with each other. It was this effect which first caused him to stretch his thoughts beyond the confines of this narrow sphere, and fix himself, as it were, in the centre of the solar system, there to contemplate the simplicity of the law which

regulates, and admire the harmony of the motions which characterize, the revolutions of the celestial orbs.

[To be continued.]

The Naturalist's Diary

For SEPTEMBER 1819.

How sweetly nature strikes the ravished eye
Through the fine veil, with which she oft conceals
Her charms in part, as conscious of decay!

SEPTEMBER is, generally, accounted the finest and most settled month in the year. The mornings and evenings are cool, but possess a delightful freshness, while the middle of the day is pleasantly warm and open. October also frequently partakes the character of its precursor. A 'morning's walk' at this season is replete with gratification to the admirer of Nature's beauties. What a magnificent phenomenon is every day exhibited in the rising of the Sun! yet how common is the observation, that indolence and the love of sleep prevent a great part of mankind from contemplating this beauteous wonder of the creation! What numbers are there, in high life especially, who prefer a few more hours of sleep to all the pleasures of a morning walk!—See some reflections on this subject in our last volume, p. 234.

Oh, busie folly! Why do I my braine
Perplex with the *dull policies of Spaine*
Or quick designs of *France*? Why not repaire
To the pure innocence of th' country aire,
And *neighbour thee, dear friend*? Who so dost give
Thy thoughts to worth and virtue, that to live
Blest, is to trace thy ways. There might not we
Arme against passion with philosophie;
And by the aide of leisure, so controule:
Whate'er is earth in us to grow all soule? HABINGTON.

Rural scenery is now much enlivened by the variety of colours, some lively and beautiful, which are assumed, towards the end of the month, by the fading

leaves of trees and shrubs. These appearances are very striking even in our own fine forests, but cannot be compared with the magnificent scenes presented to the eye of the enraptured traveller in the primeval woods which shade the equinoctial regions of Africa and America. See T.T. for 1817.—This remark applies also to *Asia*. No country, perhaps, on the globe unites so many advantages for the sustenance and propagation of animal and vegetable life as Hindostan, whence its products of both are extremely numerous and singularly luxuriant. Those extensive districts which are still in a state of nature, where not sandy deserts, are overgrown with thick forests of stately height, composed of a great variety of timber trees, of which the *teak* supplies the place of the European oak in its fitness for the purposes of house and ship-building. In these woods a number of creeping plants of extraordinary size and length run from tree to tree in festoons, connecting the whole into one mass of verdure. The river banks and marshy grounds are covered with impenetrable thickets, or *jungles*, as they are called, the secure resort of game and beasts of prey. In such situations the bamboo reed grows, the most useful for economical purposes of all the natives of hot climates. In the tropical latitudes the family of palms abound, rearing high in the air their naked trunks, crowned with green tufts of light and spreading foliage. Nothing can surpass the beauty and fragrance of the flowering shrubs that decorate the groves; and the skilful botanist alone can reckon up and describe the numerous fruit-bearing trees, and the plants which serve useful purposes in rural economy or the arts[1].

The following lively picture of an Indian forest, by the late Mr. Pennant, has a particular reference to Ceylon, though in many of its features it applies to all the tropical countries of the east:—

[1] Aikin's Geographical Delineations, vol. ii, pp. 38, 39.

'An Indian forest is a scene the most picturesque that can be imagined: the trees seem perfectly animated; the fantastic monkeys give life to the stronger branches; and the weaker sprays wave over your head, charged with vocal and various plumed inhabitants. It is an error to say that nature has denied melody to the birds of hot climates, and formed them only to please the eye with their gaudy plumage. Ceylon abounds with birds equal in song to those of Europe, which warble among the leaves of trees, grotesque in their appearance, and often laden with the most delicious and salubrious fruit. Birds of the richest colours cross the glades, and troops of peacocks complete the charms of the scene, spreading their plumes to a sun that has ample powers to do them justice. The landscape, in many parts of India, corresponds with the beauties of the animate creation: the mountains are lofty, steep, and broken, but clothed with forests, enlivened with cataracts of a grandeur and figure unknown to this part of the globe.

'But to give a reverse of this enchanting prospect, which it is impossible to enjoy with suitable tranquillity; you are harassed in one season with a burning heat, or, in the other, with deluges of rain; you are tormented with clouds of noxious insects; you dread the spring of the tiger, or the mortal bite of the naja.'—*Indian Zoology.*

Scenes like these on the South American continent are well depicted in the following lines from the '*Missionary,*' a poem, in the description of a valley near the Andes:—

> Summer is in its prime;—the parrot-flocks
> Darken the passing sunshine on the rocks;
> The *chrysomel*[1] and purple *butterfly*
> Amid the clear blue light are wandering by;

[1] The chrysomel is a beautiful insect, of which the young women of Chili make necklaces.

The *humming-bird*, along the *myrtle* bowers,
With twinkling wing, is spinning o'er the flow'rs,
And all the farther woods and thickets ring,
So loud the *cureu*[1] and the *thenca*[2] sing.
* * * *
Check'ring, with partial shade, the beams of noon,
And arching the grey rock with wild festoon,
Here, its gay net-work and fantastic twine,
The purple *cogul*[3] threads from pine to pine,
And oft, as the fresh airs of morning breathe,
Dips its long tendrils in the stream beneath.
There, through the trunks, with *moss* and *lichens* white,
The sunshine darts its interrupted light,
And, 'mid the *cedar*'s darksome boughs, illumes,
With instant touch, the *Lori*'s scarlet plumes.

The silent and gradual progress of maturation is now completed; and human industry beholds, with triumph, the rich productions of its toil. The vegetable tribes disclose their infinitely various form of *fruit;* which term, while, with respect to common use, it is confined to a few peculiar modes of fructification, in the more comprehensive language of the naturalist, includes every product of vegetation, by which the rudiments of a future progeny are developed and separated from the parent plant.

Partridges *(tetrao perdix)* are in great plenty at this season of the year: they are chiefly found in temperate climates, but nowhere in such abundance as in England. Partridges pair early in the spring: about the month of May, the female lays from fourteen to eighteen or twenty eggs, making her nest of

[1] Birds of Chili, remarkable for the melody, richness, and compass of their notes.

[2] The thenca *(turdus Thenca)* is considered by Molina as a variety of the Virginian thrush *(turdus Polyglottus)*, called the Four-hundred-tongues, from the variety of its notes.

[3] A most beautiful climbing plant. The vine is of the size of packthread: it climbs on the trees without attaching itself to them: when it reaches the top, it descends perpendicularly; and as it continues to grow, it extends itself from tree to tree, until it offers to the eye a confused tissue, exhibiting some resemblance to the rigging of a ship.—*Molina.*

dry leaves or grass upon the ground. The young birds learn to run as soon as hatched, frequently encumbered with part of the shell sticking to them; and picking up slugs, grain, ants, &c.—See the 'Partridges, an Elegy,' in T.T. for 1817, p. 282.

There are in blow, in this month, nasturtia, china aster, marigolds, sweet peas, mignionette, golden rod, stocks, tangier pea, holy-oak, michaelmas daisy, saffron *(crocus sativus)*, and ivy *(hedera helix)*. Among the *maritime* plants may be named, the marsh glass-wort *(salicornia herbacea)*, and the sea-stork's bill *(erodium maritimum)*, on *sandy shores;* and the officinal marshmallow *(althæa officinalis)* in *salt marshes.*

Herrings *(clupea)* pay their annual visit to England in this month, and afford a rich harvest to the inhabitants of its eastern and western coasts. Exclusive of the various methods of preparing this fish for sale, in different countries, an immense quantity of oil is drawn from it, forming a great and important commercial article among the northern nations.

Various of the feathered tribe now commence their autumnal music; among these, the *thrush*, the *blackbird*, and the *woodlark*, are now conspicuous. The *phalæna russula*[1], and the saffron butterfly

[1] *The* MOTH.

When dews fall fast, and rosy day
Fades slowly in the west away,
While evening breezes bend the future sheaves;
Votary of vesper's humid light,
The *moth*, pale wand'rer of the night,
From his green cradle comes, amid the whispering leaves.

The birds on insect life that feast,
Now in their woody coverts rest:
The *swallow* slumbers in his dome of clay,
And of the numerous tribes who war
On the small denizens of air,
The shrieking *bat* alone is on the wing for prey.

Eluding him, on lacey plume
The silver *moth* enjoys the gloom,

(papilio hyale), appear in this month. Flies *(musca)* abound in our windows.—See T.T. for 1816, p. 240; and for 1817, p. 274. For some pretty lines addressed to a fly, see T.T. for 1817, p. 277.—The snake *sloughs* or casts its skin in this month.

The chimney or common swallow *(hirundo rustica)* disappears about the end of September. The congregating flocks of swallows and martins on house tops, but principally upon the towers of churches on our coast, are very beautiful and amusing in this and the succeeding month. See our last volume, p. 241.—Of the migration and torpidity of the *swallow*, we have already treated at length, in T.T. for 1814, 1815, and 1816; to these volumes, therefore, we refer the ingenious naturalist, and to *Mr. Forster's Observations on the Brumal Retreat of the Swallow*, third edition, for further information on this curious subject. See also our last volume, p. 243, and the '*Swallows*,' an Elegy, in T.T. for 1817, p. 128.

Many of the small billed birds that feed on insects disappear when the cold weather commences. The *throstle*, the *red-wing*, and the *fieldfare*, which migrated in March, now return; and the *ring-ouzel*

Glancing on tremulous wing through twilight bowers,
Now flits where warm *nasturtiums* glow,
Now quivers on the *jasmine* bough,
And sucks with spiral tongue the balm of sleeping flowers.

Yet if from open casement stream
The taper's bright aspiring beam,
And strike with comet ray his dazzled sight;
Nor perfumed leaf, nor honied flower,
To check his wild career have power,
But to the attracting flame he takes his rapid flight.

Round it he darts in dimy rings,
And soon his soft and powdered wings
Are singed; and dimmer grow his pearly eyes,
And now his struggling feet are foiled,
And scorched, entangled, burnt, and soiled;
His fragile form is lost—the wretched insect dies!

S. SMITH.

arrives from the Welsh and Scottish Alps to winter in more sheltered situations. All these birds feed upon berries, of which there is a plentiful supply, in our woods, during a great part of their stay. The throstle and the red-wing are delicate eating.

Hazel-nuts are now ripe, and the filberd-tree is laden with its agreeable fruit. See a description of the hazel and filberd-tree, with some beautiful lines on the latter, at p. 119.

The oak begins to shed its acorns, and the beech nuts fall; both of which are termed mast. A luxurious pasturage is afforded for such *hogs* as are kept on the borders of forests, for about six weeks, from the end of September.—See our volume for 1816, p. 272.

The autumnal equinox happens on the 22d of September, and, at this time, the days and nights are equal all over the earth. About this period, heavy storms of wind and rain are experienced, as well as at the vernal equinox.

Now reape up your barlie, least that it be lost,
Your beanes and your peason to quite care and cost;
Remembring alwaies the age of the moone,
So shall you do nothing too late, or too soone.
With raw frute to glut thee,
In perill may put thee.

This month, whose tytle ends in R,
Presentes you oysters now in prime;
The Malfleete oyster some preferre,
And I lyke all that fleete in wine.

DESCRIPTION OF FRUIT TREES.

[Continued from p. 217.]

QUINCE TREE *(pyrus cydonia)*.—This is a low, crooked, and distorted tree, which is covered with a brown bark, and much branched. The leaves are sometimes roundish, and at other times egg-shaped, of a dusky green colour above, and whitish underneath. It is one of the first exotic fruits that was

brought into England. The quince is also supposed to have been the *Golden Apple* of the *Hesperides*, so famous in antient fable. The tree may be raised from the kernels of the fruit sown in autumn; but there is no certainty that they will produce the same sort of good fruit, neither do they soon begin to bear. On this account the several varieties are propagated by cuttings and layers, as well as suckers from trees that grow upon their own roots; and also by grafting and budding. There are three principal varieties. The *Pear* quince, which is an oblong fruit lengthened at the base. The *Apple* quince, which is a rounder kind; and the *Portugal* quince, which is more juicy, and not so harsh as the two former, and therefore most valuable. This fruit has a peculiar smell and an austere taste when raw, but is greatly esteemed when prepared. The juice was formerly made into a syrup; and often expressed and taken to allay nausea, vomiting, and similar disorders. When used in small quantities it is said to be cooling and restringent. A mucilage is prepared from quince seeds by boiling a drachm of them in eight ounces of water until it acquires a proper consistence, but any of the simple gums will more effectually serve the same purpose. Standard quinces designed as fruit trees may be planted in the garden or orchard, and some by the side of a fish-pond or ditch, as they delight in moisture. They may also be planted in shrubberies, either as full or low standards, and should always be permitted to take their own way of growth. The wood of this tree is rarely applicable to any other use than for fuel; as the stem like that of the apple, to which it is so nearly allied, seldom grows to any considerable size.

Raspberry-Bush (*rubus idæus*).—This well known bush is generally about two feet high, and thickly set with small prickles. The stems remain upright till the second year, when they begin to bear fruit and then lie down. This fruit was antiently

called *Raspis* or *Raspisberry*, and in some countries *Hind-berry*; and by some persons *Framboise*, from the French. It is found all over Europe in moist situations, in woods and hedges, but it is remarkably plentiful in Wales and in some parts of Scotland. Although the raspberry, in its natural state, is grateful to most palates, sugar certainly improves the flavour, and hence it has been converted into a sweatmeat, as well as used to communicate a most delicious flavour to currant-pies. When ripe it dissolves the tartar, which is so injurious to the teeth; and is fragrant, slightly acid and cooling; so that it allays heat and thirst in common with other summer fruits. Young kids are extremely fond of the fresh leaves. There are three varieties of the common sort, and some other species, all of which deserve notice. The varieties are the *Red-fruited*, the *White-fruited*, the *Twice-bearing*, and the *Smooth* raspberry, which last is thought to be a distinct species. These are certainly accidental varieties; and the size of their fruit has been much increased by culture, but probably at the expence of their flavour. The *Virginian* raspberry, which grows in North America, has purplish stalks that rise higher than the English sorts. It is known at first sight by the blue cloud or bloom on the stem. The fruit is generally black, but there is a red variety, which has a tarter and pleasanter taste than the European raspberry.

The *Dewberry* bramble is a species of wild raspberry, like the common bramble; the berries it produces are agreeably acid, and have not that faint, unpleasant, taste which distinguishes the common *Blackberry*. The latter, however, is equally allied to the raspberry genus, and though it is a troublesome weed, produces one of the essential ingredients in elder-wine, which is so much valued for its domestic uses. The bramble will also form the most impenetrable of all live fences, while its green

twigs are of great use in dyeing woollen, silk, and mohair black. The leaves are very astringent; and silk worms will sometimes eat them when mulberry leaves cannot be procured. The mountain bramble or cloud-berry, another member of the same family, should not be contemned. It is an elegant plant, with an upright stem hardly a foot high. The berries are of a tawny or dull orange colour; they are acid, mucilaginous, and not unpleasant. Being found upon the highest mountains in various parts of Europe, they have been called *Cloud-berries*. They bloom in June, soon after the snow dissolves, and are hardly ripened before the plant is again overwhelmed with its wintery covering. The snow preserves the fruit, and the Scotch Highlanders hold it in great esteem on account of its long duration. They have something of the flavour of tamarinds, and are thought to be antiscorbutic. The Norwegians pack them up in wooden vessels, and send them to Stockholm, where they are served up in desserts, or made into tarts: and the poor Laplanders bruise and eat them with the milk of the reindeer. It is remarkable that all these bushes are sufficiently hardy to bear fruit to perfection in this country. Our own common raspberry is propagated by suckers, but is better when raised from layers, and should be planted in a fresh strong loam. The *Virginian* raspberry deserves attention; it is easily increased by suckers, and only requires to be restrained within proper bounds. The youngest plants produce the finest flowers and fruit; for which reason, and also for the largeness and elegant form of the leaves, it has long had a place in our ornamental plantations. The brambles put out roots at every joint, and will thrive in any soil or situation.

STRAWBERRY-BUSH *(fragaria vesca)*. — The common species of this fruit obtained its name from the running stems which, in the language of our fore-

fathers, were strawed or strewed over the ground, and the fruit of which had been inadvertently called a berry. The appearance of this humble bush and the excellence of the fruit it bears are well pourtrayed in the following plaintive lines:—

> The strawberry blooms upon its lowly bed:
> *Plant of my native soil!* The *lime* may fling
> More potent fragrance on the zephyrs wing,
> The milky *cocoa* richer juices shed,
> The white *guava* lovelier blossoms spread;
> But not, like thee, to fond remembrance bring
> The vanished hours of life's enchanting spring;
> *Short calendar of joys for ever fled!*
> Thou bid'st the scenes of childhood rise to view
> The wild wood path which fancy loves to trace,
> Where, veiled in leaves thy fruits of rosy hue,
> Lurked on a pliant stem with modest grace.

It would be impossible to notice all the sorts of this delicate and salutary fruit, and improper not to mention the most remarkable. The first of these is the *Common Wood* strawberry; the fruit of which is small and generally red. In England, where it is too much shaded by woods and hedges, it generally has but little flavour; though, in warmer countries, it becomes larger and higher flavoured. There is a subordinate variety of this sort called the *White Wood*-strawberry, which ripens rather later in the season. This is often preferred for its quick flavour; but, as it is less productive than the other, is not so much cultivated. The *Alpine* strawberry-bush is taller than either of these: the fruit is larger, and both red and white. This is a very valuable kind, continuing in fruit from June till the autumn frosts set in; and on this account, the Dutch call it *Everlasting strawberry*. The rough-fruited kind of strawberry is merely an accidental variety. The *Hautboy* is the kind most cultivated in England. This will soon degenerate where neglected; but, when well managed in a good soil, will produce a great quantity of large well-flavoured fruit. The *Chili* strawberry yields plenty of firm,

well-flavoured fruit; but, being unproductive, has been generally neglected. The *Scarlet* strawberry, which differs very much from the common sort in leaf, flower, and fruit, is the first strawberry that becomes ripe, and is also thought to be the best kind now known. The *Pine* strawberry has something of the smell and taste of the pine-apple. Strawberries, either eaten separately or with sugar and milk, are universally esteemed a most delicious fruit. They are grateful and cooling, and seldom disagree with the stomach, even when taken in large quantities. They promote perspiration, and have been known to give great relief in the gout and stone, when eaten daily. The first physicians have successfully prescribed them for consumptive habits. The strawberry surpasses the raspberry as a dissolver of the tartar which destroys the teeth, but requires more care in the cultivation. They grow best in a delicate loam, and will not bear much fruit in a light soil. The low growth and nature of this creeping plant are noticed by SHAKSPEARE, who says, Henry V, act 1, sc. 1,

> The *Strawberry* grows underneath the Nettle,
> And wholesome berries thrive and ripen best,
> Neighboured by fruit of baser quality.

The same poet, in a passage which he has versified from one of our old historians, has preserved a fact by which it is proved that this fruit has been cultivated in London, at least, ever since the reign of Richard the Third. See the play of that name, act 3, sc. 4, where Gloster thus addresses the Bishop of Ely:

> My Lord of Ely, when I was last in HOLBORN,
> I saw good *Strawberries* in your garden there;
> I do beseech you send for some of them.

We shall conclude the praises of the Strawberry with the quaint saying of an old writer: GOD *might have made a better* berry *than the* strawberry, *but certainly he never did.*

OCTOBER.

THIS month was called *Domitianus* in the time of Domitian; but after his death, by the decree of the Senate, it took the name of October, every one hating the name and memory of so detestable a tyrant. It was called *wyn-monat*, or wine month, by the Saxons.

Remarkable Days

In OCTOBER 1819.

1.—SAINT REMIGIUS.

REMIGIUS was born at Landen, where he so closely pursued his studies, that he was supposed to lead a monastic life. After the death of Bennadius, he was, on account of his exemplary piety and extraordinary learning, chosen bishop of Rheims. Having held his bishopric 74 years, he died at 96 years of age. A.D. 535.

*3.—FIRST SUNDAY IN OCTOBER.

On this day, formerly, was held throughout the kingdom, established by a decree of convocation, in the twenty-eighth year of Henry VIII, THE FEAST OF DEDICATION OF CHURCHES. This, however, we believe, is no where observed now, each parish having its *Feast*, or *Wake*, on the Sunday after the saint's day to whom its church is dedicated. These yearly feasts have both their advantages and evils. They are useful, as a fixed and known time for the relations and friends of the inhabitants of the respective villages to pay their annual visits, at a period when preparations are made for their reception; and thus the trouble and expence of this one festival suffices for the ensuing year. Their evils are, that even this expence is often such as some can ill afford, together with the vanity of dress, the drinking, gaming, dancing, and its too frequent bad consequences, which attend them. (See Wheatley on the Com. Prayer, ch. ii, 3, 6.)

*3. 1812.—MOSCOW BURNT.

6.—SAINT FAITH.

This virgin martyr suffered death under Dacianus, about the year 290, the most cruel torments being inflicted upon her.

9.—SAINT DENYS.

Saint Denys, or Dionysius, the Areopagite, was converted to Christianity by St. Paul. See *Acts* xvii. He was, at first, one of the Judges of the celebrated court of the Areopagus, but was afterwards made Bishop of Athens, where he suffered martyrdom for the sake of the gospel.

In our last year's volume, we gave Mr. Eustace's description of the abbey erected to the honour of this saint, as it appeared in 1790, and again in 1802: in addition to which, an account of this celebrated structure in 1643, written by Mr. John Evelyn (well-known as the author of the 'Sylva'), may not be unacceptable to our readers.

'The church,' says Mr. E. 'is now 390 foote long, 100 in bredth, and 80 in height, without comprehending the cover; it has a very high shaft of stone, and the gates are of brasse. In the choir are the sepulchres of the most antient kings: without it are many more: amongst the rest, that of Bertrand du Guesclin, Constable of France, in the Chapell of Chas. V, all his posterity, and neere him the magnificent sepulchre of Francis I, with his children, warres, victories, and triumphs, engraven in marble. Above are bodies of several saints; below, under a state of black velvet, the late Lewis XIII. Every one of the ten chapels, or oratories, had some saints in them; among the rest, one of the Holy Innocents. The treasury is in the sacristy above, in which are crosses of massy gold and silver, studded with precious stones, one of gold three feet high. Amongst the still more valuable reliques are a naile from our Saviour's Cross, in a box of gold, full of precious stones; a crucifix of the true wood of the Crosse, carved by Pope Clement III,

inchased in a chrystal covered with gold; a box in which is some of the Virgin's haire; some of the linnen in wch our blessed Saviour was wrapped at his nativity; in a huge reliquary modelled like a church, some of our Saviour's blood, hair, cloathes, linnen with which he wiped the Apostles' feet, with many other equally authentic reliques. Amongst the treasures is the Crowne of Charlemagne, his seven foote high scepter and hand of justice, his sword, belt, and spurrs of gold; the Crowne of St. Lewis, covered with precious stones, amongst which is one vast ruby, uncut, of inestimable value, weighing 300 carrats (under which is set one of the thorns of our blessed Saviour's crowne,) his sword, seal, and hand of justice. The two crownes of Hen. IV, his scepter, hand of justice, and spurrs. The two crownes of his son Lewis. In the cloak royal of Ann of Bretagne, is a very great and rare rubie. Divers bookes covered with solid plates of gold, and studded with precious stones. Two vasas of berill, two of achate, whereof one is esteemed for its bignesse, colour, and carving imbossed, the best now to be seene; by a special favour I was permitted to take the measure and dimensions of it; the story is a Bachanalia. It is really antique. There is a large gundola of chrysolite, a huge urn of porphyry, another of chalcedone, a vasa of onyx, the largest I had ever seen of that stone; two of chrystal; a morsel of one of the water-pots in which our Saviour did his first miracle; the effigies of the Queen of Saba, of Julius, Augustus, Marc Antony, Cleopatra, and others, upon saphyrs, topazes, agates, and cornelians; that of the Queen of Saba has a Morish face; those of Julius and Nero on achates rarely coloured and cut. A cup in which Solomon was used to drinke. Apollo on a great amethyst. There lay in a window a miroir of a kind of stone, said to have belonged to the poet Virgil. Charlemayne's chessemen, full of Arabiq characters. In the presse next the doore, the brass lanthorn full

of chrystals, said to have conducted Judas and his company to apprehend our B. S. A faire unicorne's horne, sent by a K. of Persia, about seven foote long. In another presse (over which stands the picture in oil of their Orleans Amazon with her sword) the effigies of the late French kings in wax, like ours in Westminster, covered with their robes, with a world of other rarities.'

*12. 1711.—WILLIAM TYTLER BORN,

Author of an Inquiry into the Evidence against Mary Queen of Scots, which Lord Chancellor Hardwicke declared to be 'the best concatenation of circumstantiate proofs, brought to bear upon one point, that he had ever perused.' In music, as a science, he was uncommonly skilled. It was his constant amusement; and, with that natural partiality which all entertain for their favourite objects, he was apt to assign to it a degree of moral importance, which some might deem a little whimsical. He has often been heard to say, that he never knew a good taste in music associated with a malevolent heart; and, being asked what prescription he would recommend for attaining to an old age, as healthful and happy as his own,—"My prescription," said he, "is simple: short but cheerful meals, music, and a good conscience." He died Sept. 12, 1792.

13.—TRANSLATION OF KING EDWARD THE CONFESSOR.

He was the youngest son of King Ethelred; but as all his elder brothers were either dead, or had fled away, he succeeded to the crown of England in the year 1042. He collected all the most useful laws made by the Saxon and Danish kings. The additional title of Confessor was probably given him by the pope, for settling what was then called *Rome-Scot*, but now is better known by the name of *Peter's Pence*. For some pretty lines on this subject, see T.T. for 1815, p. 281.

*16. 1555.—RIDLEY AND LATIMER BURNT AT OXFORD.

Having dressed himself in his episcopal habit, Ridley walked to the place of execution, between the mayor and one of the aldermen of Oxford; and seeing Latimer approach, from whom he had been separated since their condemnation, he ran to meet him, and with a cheerful countenance embraced him, and exclaimed, 'Be of good heart, brother, for God will either assuage the fury of the flames, or else give us strength to endure them.' When they were brought to the fire, and, after a suitable sermon, were told by an officer that they might now make ready for the stake, they supported each other's constancy by mutual exhortations. Latimer, when tied to the stake, called to his companion, 'Be of good cheer, brother; we shall this day kindle such a torch in England, as I trust in God shall never be extinguished.' The executioners had been so merciful (for that clemency may more naturally be ascribed to them than to the religious zealots) as to tie bags of gunpowder about these prelates, in order to put a speedy period to their tortures. The explosion killed Latimer immediately; but Ridley continued alive during some time in the midst of the flames.

Here LATIMER and RIDLEY in the flames
Bore witness to the truth. If thou hast walked
Uprightly thro' the world, proud thoughts of joy
Will fill thy breast in contemplating here
Congenial virtue. But if thou hast swerved
From the right path, if thou hast sold thy soul,
And served, a hireling, with apostate zeal,
The cause thy heart disowns,—oh! cherish well
The honourable shame that sure this place
Will wake within thee, timely penitent,
And let the future expiate the past. SOUTHEY.

*16. 1817.—GENERAL KOSCIUSKO DIED.

A singular felicity of reputation has ever attended this admirable citizen and warrior. In the cause of

genuine liberty he fought against injustice, and shamed both the tyrants and jacobins of the age. In his days of power, at the head of armies that adored his name, no false glory dazzled him, nor corrupt ambition could betray him. He nobly resisted the foreign potentates who laid waste his country, not because they were kings and emperors, but because they were invaders and oppressors; in the rare and pure spirit of freedom and loyalty, he bled for the King and Constitution of his native country. When Poland lost her independence, Kosciusko lost his home: the court of Russia would have allured this illustrious defender of the people whom she had subjugated, by temptations irresistible to vulgar minds; Bonaparte would have made him the flattered instrument of a spurious and hollow liberality to his countrymen; but Kosciusko saw that their lot was irretrievable, and his own he refused to change. As a Soldier and a Patriot, in public life and in retirement, his principles were untainted, and his name unsullied: the monarchs whom he opposed, respected him; the factions who failed to seduce, forbore to slander him; and he would have been the WASHINGTON, had he not been the WALLACE, of Poland. In 1814, the Emperor Alexander had a long interview with Koscuisko, and expressed a wish to restore him to his former rank and consequence in the country that had given him birth; but, with a consistency worthy of his character, he replied: 'If, by Poland, your Majesty means *that* Poland, such as it was in 1794, I am both ready and willing to return to my native land; but I cannot condescend to serve under a *foreign* prince, who wears its crown.' It was at Soleure, in Switzerland, that this brave and virtuous Pole resigned his breath, in the sixty-fifth of his age, happy to draw his last sigh within sight of the canton that gave birth to William Tell.

17.—SAINT ETHELDREDA.

She was a princess of distinguished piety, daughter

of Anna, King of the East-Angles, and Hereswitha his queen, and was born about the year 630, at Ixning, a small village in Suffolk. In the year 673, she founded the conventual church of Ely, with the adjoining convent. Of this monastery she was constituted abbess, the monks and nuns living in society and regular order: it flourished for nearly two hundred years, but was destroyed, with its inhabitants, by the Danes, in 870.—See T.T. for 1814, p. 255.

18.—SAINT LUKE THE EVANGELIST.

Luke was born at Antioch, the metropolis of Syria, a place celebrated for the study of the liberal arts. The notion that he was a painter is without foundation, as it is not countenanced by antient writers. Dr. Lardner thinks that he might have been by profession a physician, as the expression 'beloved physician,' *Col.* iv, 14, seems to intimate. Luke lived a single life, and died in the 84th year of his age, about the year of Christ 70; probably a natural death.

25.—ACCESSION OF KING GEORGE III.

Upon the death of George II, his present Majesty came to the throne, on the 22d of September 1760.

ODE *for the 25th of* OCTOBER.

This *was* a day of Jubilee,
A day to every Briton dear;
But now, unmeet the sound of glee,
'Tis hallowed with a silent tear;—
That 'God would save,' no more the prayer—
We only ask—that Heav'n would spare.

Oh! honoured be that aged head,
White with the venerable snows
That 'fourscore years' have sternly shed;
Oh! doubly honoured by the woes
That left him but a shadowy throne,
In storms, in darkness, and alone.

And yet, tho' 'quenched those orbs' in night,
Tho' lost that mind in deepest shade,
Celestial visions, pure and bright,
And Angel visits duly paid,
May break on this dark wint'ry state,
And cheer the blind—the ipsulate.

Oh, God! if such communion be
The solace of his loneliness—
If his high converse be with Thee
And Angels, who his visions bless—
Then, who would such illusion break?
Oh! who would bid such dreamer wake?

Peace be with thee, afflicted Sire!
Howe'er from Reason's path astray,
May Heav'n still lend its pillared fire
To guide thee on thy lonely way;
Fill thy soul here with thoughts sublime,
And loose thee in its own good time!

25.—SAINT CRISPIN.

Crispinus and Crispianus, two brothers, were born at Rome; whence they travelled to Soissons in France, about the year 303, to propagate the Christian religion. Being desirous, however, of rendering themselves independent, they gained a subsistence by shoemaking. It having been discovered that they privately embraced the Christian faith, and endeavoured to make proselytes of the inhabitants, the governor of the town immediately ordered them to be beheaded, about the year 308. From this time, the shoemakers chose them for their tutelar saints. There is a curious anecdote relative to this day in T.T. for 1816, p. 291.

The fraternity of shoemakers have unquestionably given rise to some characters of great worth and genius. The late *Mr. Holcroft* was originally a shoemaker, and, though the principles which he professed at the beginning of the French revolution were extremely obnoxious, yet he was certainly a man of great genius, and, on the whole, a moral writer. His dramatic pieces must rank among the best of those on the English stage. *Robert Bloomfield* wrote his poem of 'The Farmer's Boy,' while employed at this business; and *Dr. William Carey*, Professor of Sanscrit and Bengalee in the College of Fort William, Calcutta, and the able and indefatigable translator of the Scriptures into many of the eastern languages, was

in early life a shoemaker in Northamptonshire. The present *Mr. Gifford*, the translator of Juvenal, and the supposed editor of the *Quarterly Review*, spent some of his early days in learning the 'craft and mystery' of a shoemaker, as he tells us, in one of the most interesting pieces of auto-biography ever penned, and prefixed to his nervous and elegant version of the great Roman satirist.

26.—PROCLAMATION OF KING GEORGE III.

His present Majesty was proclaimed King on the 26th of October, 1760, the day after his accession to the throne.

28.—SAINT SIMON AND SAINT JUDE, *Apostles.*

Simon is called the *Canaanite*, from the Hebrew word *Cana*, to be zealous; hence his name of *Simon Zelotes*, or the Zealot, *Luke* vi, 15. After enduring various troubles and afflictions, he, with great cheerfulness, suffered death on the cross.

Jude is called both by the name of Thaddæus and Lebbæus: *Matt.* x, 3, and *Mark* iii, 18. Jude, the brother of James: *Jude*, verse 1. And Judas, not Iscariot: *John* xiv, 22. He was of our Lord's kindred; *Is not his mother called Mary, and his brethren James and Joses, and Simon and Judas?* Matt. xiii, 55. After great success in his apostolic ministry, he was, at last, for a free and open reproof of the superstitious rites of the Magi, cruelly put to death. He has left one epistle of universal concern to Christians.

*29. 1804.—GEORGE MORLAND DIED, ÆT. 39.

His conduct was irregular beyond all calculation, and all powers of description; and while the vigour of his genius and the soundness of his judgment never forsook him in a picture, they scarcely ever accompanied him in any other employment, action, or sentiment of his life. Capable of the most regular and profound reflection on every thing connected with his art, capable even of the clearest distinctions of moral rectitude, he never appears to have dedi-

cated a single leisure hour to sober conversation or innocent pleasantry, to any of the endearing intercourses of domestic or social life, or to any rational purpose whatever. He is generally acknowledged to have spent all the time in which he did not paint, in drinking, and in the meanest dissipations, with persons the most eminent he could select for ignorance or brutality; and a rabble of carters, hostlers, butchers' men, smugglers, poachers, and postilions, were constantly in his company, and frequently in his pay. He was found at one time, we are told, in a lodging at Somers-town, in the following most extraordinary circumstances: his infant child, that had been dead nearly three weeks, lay in its coffin in one corner of the room; an ass and foal stood munching barley-straw out of the cradle; a sow and pigs were solacing in the recess of an old cupboard; and himself whistling over a beautiful picture that he was finishing at his easel, with a bottle of gin hung up on one side, and a live mouse sitting (or rather kicking) for his portrait, on the other!

Astronomical Occurrences

In OCTOBER 1819.

THE Sun enters Scorpio at 9 m. after 6 in the morning of the 24th of this month; and he rises and sets during the same period at the times specified in the following

TABLE.

Of the Sun's Rising and Setting for every fifth Day.

October 1st, Sun rises	11	m. after	6.	Sets	49	m. after	5
6th,	- - - 22	- -	6	-	38	- -	5
11th,	- - - 32	- -	6	-	28	- -	5
16th,	- - - 41	- -	6	-	19	- -	5
21st,	- - - 51	- -	6	-	9	- -	5
26th,	- - - 1	- -	7	-	59	- -	4
31st,	- - - 11	- -	7	-	49	- -	4

Equation of Time.

If the following numbers be subtracted from the time as indicated by a good sun-dial, the remainders will be the time which should be shown by a well regulated clock at the same instant.

TABLE.	*m.*	*s.*
Friday, October 1st, from the time by the dial *subtract*	10	7
Wednesday, - - 6th, - - - - - - - - - - - -	11	40
Monday, - - - - 11th, - - - - - - - - - - -	13	3
Saturday, - - - 16th, - - - - - - - - - - -	14	13
Thursday, - - - 21st, - - - - - - - - - - -	15	10
Tuesday, - - - 26th, - - - - - - - - - - -	16	0
Sunday, - - - - 31st, - - - - - - - - - - -	16	12

Phases of the Moon.

Full Moon, - 3d day, 22 m. after 3 afternoon.
Last Quarter, 11th - 57 - - 2 morning.
New Moon, 19th - 55 - - 3 - - - -
First Quarter, 26th - 54 - - 5 - - -

Moon's Passage over the Meridian.

The Moon will pass the first meridian of this country at the following convenient times for observation, if the weather prove favourable: viz.

October 1st, 39 m. after 10 in the evening.
10th, 29 - - - 5 morning.
11th, 21 - - - 6 - - - - -
12th, 10 - - - 7 - - - - -
25th, 54 - - - 5 in the evening.
26th, 52 - - - 6 - - - - -
27th, 47 - - - 7 - - - - -
28th, 38 - - - 8 - - - - -
29th, 26 - - - 9 - - - - -
30th, 14 - - 10 - - - - -

The Moon will also be eclipsed on the 3d of this month. But as the eclipse begins about 36 m. after 1 in the afternoon, and she does not pass the meridian of the Royal Observatory till past 12 at night, the eclipse will necessarily be *invisible* in this country, as the Moon will not have risen at the time.

Phase of Venus.

Oct. 1st	Enlightened part	11·99159 digits.
	Dark part	0·00841

Venus is at this time evidently very near her superior conjunction, since nearly the whole of her disc would be seen enlightened, if not for the rays of the Sun, which prevent her from being visible at this time. Her conjunction, indeed, takes place at 30 m. after 6 in the evening of the 9th.

Eclipses of Jupiter's Satellites.

The following will be the eclipses of Jupiter's Satellites visible at the Royal Observatory this month.

EMERSIONS.

1st Satellite	4th	day, at	40	m.	after	9	evening.
	21st	- -	1	- -		8	- - -
2d Satellite	6th	- -	21	- -		8	- - -

Form of Saturn's Ring.

October 1st	Conjugate diameter	—·054
	Transverse ditto	1·000

Other Phenomena.

Mercury will be in superior conjunction at 15 m. after 8 in the morning of the 21st. Venus at 30 m. after 6 in the evening of the 9th. Mars will be in quadrature at 30 m. after 12 on the 15th. Jupiter will be stationary on the 4th. The Moon will be in conjunction with Saturn at 59 m. after 5 in the evening of the 2d; with β in Taurus at 2 m. after 11 in the night of the 8th; with Pollux, at 32 m. past 10 in the morning of the 11th; with Spica in Virgo, at 14 m. after 9 in the evening of the 18th; and with α in Scorpio at 19 m. past 9 in the morning of the 22d of this month.

On the EFFECTS *of* GRAVITATION.

[Continued from p. 234.]

The effects of gravity are familiar to us in the oscillations of the pendulum, from which society receives

so much advantage as a measure of time. The same instrument has also been applied with great success in determining the figure of the Earth. The length of the pendulum, which is the distance between the centre of suspension and the centre of oscillation of the vibrating body, is always in proportion to the force of gravity at the place where it is used, when the time of vibration is constant; and hence the pendulum becomes a proper instrument for measuring its intensity; and, consequently, for ascertaining the comparative distances of different places from the centre of attraction. If we denote the length of the pendulum by l; the intensity of gravity, as measured by the space which a heavy body would describe in a second with the velocity acquired in the first second of its descent uniformly continued, by g; the ratio of the diameter of a circle to its circumference by π; and the time of one vibration by t; then mathematicians prove that, when the arcs of vibration are small, the relation between the length of the pendulum and the time of its vibration is expressed by the equation,

$$t = \pi\sqrt{\frac{l}{g}}.$$

In any other situation, where the length of the pendulum is l', and the intensity of gravity g', the same relation is expressed by

$$t = \pi\sqrt{\frac{l'}{g'}}.$$

Now if the times in both instances be equal, as one second, for example, we necessarily have

$$\pi\sqrt{\frac{l}{g}} = \pi\sqrt{\frac{l'}{g'}};$$

but as π is common to both sides of the equation, we may divide by it, and then

$$\sqrt{\frac{l}{g}} = \sqrt{\frac{l'}{g'}}.$$

By squaring both sides, we have

$$\frac{l}{g} = \frac{l'}{g'};$$

and by converting this equation into a proportion,

$$l : l' :: g : g'.$$

When, therefore, the length of the seconds pendulum is found by experiment in different parts of the globe, the ratio of the intensity of gravity in these places is determined.

As the pendulum is caused to vibrate by the force of gravity, the greater the intensity of this force, the greater will be its velocity, and, consequently, the quicker its vibrations, when the length of the pendulum remains constant. The duration of each of these oscillations is ascertained by the number which a pendulum makes in a given interval between two consecutive passages of a star over the same meridian; for instance, when a pendulum is transported to different parts of the earth, experience shows that the velocity of its oscillations increases from the equator to the poles; and the law of this acceleration, which has been determined with great accuracy, is as the square of the sine of the latitude; as the rotation of the globe on its axis requires. *Richer*, who was sent by the French Academy of Sciences to Cayenne, for the purpose of making astronomical observations, was the first who put this interesting fact to an experimental proof. He found that his clock, which had been regulated to mean time at Paris, lost a sensible quantity every day at Cayenne. This was the first direct proof that was obtained of the diminution of gravity at the equator; and it has since been very carefully repeated in a great number of places, all of which have confirmed the general result; the resistance of the air being also taken into consideration. The following table shows the general results that have been obtained on this subject; the length

of the pendulum at the equator being unity, and the time of vibration in all of them the same: viz.

Latitude.	*Length of the Pendulum.*
0° 0′	1·00000
18 0	1·00076
43 36	1·00282
48 50	1·00332
66 48	1·00470.

The lengths of pendulums oscillating in the same time being proportional to the gravitating forces by which they are caused to vibrate, it is evident from the preceding series that the force of gravity increases from the equator to the poles; since, in order that the pendulum may make each of its vibrations in the same time, in different latitudes, it is necessary to increase its length, as the latitude augments. This increase in the length of the pendulum is nearly proportional to the square of the sine of latitude, as may easily be proved by a comparison of the numbers in the preceding table with each other; and it affords another proof of the diurnal revolution of the Earth on its axis. These numbers also represent the proportional weights of the same mass of matter, if transported respectively into these latitudes. And likewise, as the spaces through which heavy bodies descend, when at full liberty to obey the action of this force, are always proportional to the forces by which they are put in motion, the relation of these spaces will also be expressed by the preceding numbers.

It is, however, only the ratio of the absolute lengths of the pendulum that is given for the respective latitudes in the above table, and which may be found for any other latitude by means of the square of its sine. In order to find the absolute lengths, one of them must be given. Now it has been determined by numerous experiments, that, in the latitude of London, the length of the seconds pendulum is very nearly equal to 39⅛ English inches. Hence by means of

this length, that for any other latitude may be found by proportion.

But as the length of the pendulum will necessarily vary according to the species of time in which its vibrations are estimated, it becomes the first subject of consideration to fix upon the species of time in which these vibrations are to be reckoned. That which corresponds to the length above specified is the second of *mean* time. By this we are enabled to ascertain the length of the pendulum, acted upon by the same force of gravity, or, which is the same thing, situated on the same parallel of latitude. Under these circumstances, the lengths of simple pendulums are to each other as the squares of their times of vibration; for we have

$$t = \pi\sqrt{\frac{l}{g}}, \text{ and } t' = \pi\sqrt{\frac{l'}{g}}$$

and therefore

$$t : t' :: \pi\sqrt{\frac{l}{g}} : \pi\sqrt{\frac{l'}{g}};$$

and by omitting the quantities that are common to the last two terms of this proportion, we have

$$t : t' :: \sqrt{l} : \sqrt{l'},$$
$$\text{or } t^2 : t'^2 :: \quad l : \quad l'.$$

Then by substituting the numbers in this proportion, gives

$$1^2 : \cdot 99727^2 :: 39\cdot 125 : 38\cdot 9116,$$

which is the length of the pendulum vibrating sidereal seconds in the latitude of London; and for any other latitude its length may be found by the principles above stated.

In general terms; if we denote the latitude by L, the corresponding length of the seconds pendulum by l, and that of the seconds pendulum at the equator by l'; it has been found, from a great number of observations, that the value of l is expressed by the following formula: viz.

$$l = l' + \cdot 1608 \sin^2 L.$$

By substituting for the $\sin^2 L$ its value

$$\frac{1 - \cos 2L}{2},$$

the formula becomes

$$l = l' + (\cdot 1608 \times \frac{1 - \cos 2L}{2}),$$

or $l = l' + \cdot 0804\,(1 - \cos 2L)$.

Now the value of l' has been found to be 39·0265 English inches, and hence, by substitution,

$$l = 39 \cdot 0265 + \cdot 0804 - \cdot 0804 \cos 2L = 39 \cdot 1069 - \cdot 0804 \cos 2L,$$

in which value 39·1069 is the length of the seconds pendulum at 45° of latitude; and it will be observed that when the latitude, or the value of L, is less than 45°, the latter member will be subtractive, but when it exceeds 45° it will be additive; for then the cos 2L becomes negative; and consequently the product of that cos by —·0804 must be added to the number 39·1069. If we take the latitude of 51° 30′ as an example, which is nearly that of London, this formula gives the length of the seconds pendulum for that latitude = 39·124986 inches; agreeing with the length as found by experiments.

This formula is analogous to that for the increase in the degrees of latitude, and the ellipticity of the Earth as deduced from each is very nearly the same; that from the pendulum being $\frac{1}{578}$, and that given by the measurement of degrees $\frac{1}{570}$. The length of a pendulum may also be found from the number of vibrations it makes in a given time, as well as from the time of each vibration, for these are evidently in the reciprocal ration of the times: we have, therefore,

$$t : t' :: \frac{1}{n} : \frac{1}{n'},$$

where n and n' denote the numbers of vibrations cor-

responding to t and t'. Hence, by substituting these values for t and t' in the preceding formula,

$$\frac{1}{n} : \frac{1}{n} :: \sqrt{l} : \sqrt{l'},$$

$$\text{or } n^2 : n'^2 :: l' : l.$$

The numbers being substituted in this formula, will immediately give the corresponding length of the pendulum. Thus, if it were required to find the length of the pendulum that would vibrate half seconds in the latitude of London, we have

$$60^2 : 120^2 :: l' : 39\tfrac{1}{8},$$

$$\text{or } 1 : 4 :: l' : 39\tfrac{1}{8};$$

consequently

$$l' = \frac{39\frac{1}{8}}{4} = 9\tfrac{25}{32} \text{ inches.}$$

The Naturalist's Diary

For OCTOBER 1819.

Farewel to SPRING's enchanting reign,
And SUMMER's smiling charms, adieu!
Farewel, awhile; ye soon again
Shall all your countless sweets renew.

Now welcome AUTUMN's yellow leaf,
Ye hollow gales of Autumn blow;
'Tis your's to calm the bosom's grief,
And sympathetic peace bestow.

Bid me redeem life's wasted morn,
For WINTER's bitter blasts are nigh;
And soon from earthly objects torn,
This frame in kindred dust shall lie.

To HIM then prostrate let me bow,
To Him whose arm is strong to save;
Who can eternal SPRING bestow,
That Spring which blooms beyond the grave.

As the spring and summer seasons have their distinguishing excellencies, so it is, in an especial manner, with respect to *autumn*. The reviving freshness of the spring is long past, and the summer is declin-

ing; autumn succeeds, and its rich blessings may be considered as pleasing to the sight, gratifying to the palate, and cheering to the spirits.

How agreeable is it to behold the quick succession in the productions of nature during the spring, summer, and autumnal seasons! And, notwithstanding, before the commencement of autumn, some fruits and many flowers are gone, yet we scarcely miss them, so quickly are they succeeded by others, the greater part of which are much more important; for the autumnal fruits are those chiefly which are preserved for future use.

In this season, likewise, as the summer vegetables decline, they are succeeded by others no less salubrious and pleasant to the taste; while at the same time our tables are supplied with a variety of animal food, too often abused by the sin of gluttony, but which, in the temperate use of it, is adapted to nourish us, and excite our lively gratitude to Him 'who giveth us all things liberally to enjoy.'

The general state of the weather toward the close of autumn has a tendency to revive the natural spirits of those whose constitutions have been debilitated by the preceding heats. A great part of the day during the summer is too sultry for exercise; but, as autumn advances, the air becomes more temperate, and the evenings, particularly, are serene and pleasant.

The groves now lose their leafy honours; but, before they are entirely tarnished, an adventitious beauty, arising from that gradual decay which loosens the withering leaf, gilds the autumnal landscape with a temporary splendour, superior to the verdure of spring, or the luxuriance of summer. The infinitely various and ever-changing hues of the leaves at this season, melting into every soft gradation of tint and shades, will long continue to engage the imitation of the painter, and the contemplation of the poet and the philosopher. How pleasant is it,

Sometimes outstretched in very idleness,
To view the leaves (thin dancers upon air)
Go eddying round; and small birds how they fare,
When mother AUTUMN fills their beaks with corn
Filched from careless Amalthea's horn;
And how the woods, berries and worms provide
(Without their pains) when earth hath nought beside,
To answer their small wants in the drear winter's tide;
To view the graceful deer come tripping by,
Then stop and gaze—then turn they know not why,
Like bashful younkers in society!
To mark the structure of a plant or tree,
And all fair things of earth—how fair they be!

C. LAMB.

The awful stillness and solitude of a forest are thus described by Mr. GISBORNE:—

I would speak
The calm that stills your wilds—their guest o'erspreads
Diffusive—creeps along the conscious frame,
Bids pause each artery—stay each active limb;
Each rebel passion chains, and through the soul
Breathes holy peace and universal love!
For since the globe first rolled—in every land,
Your shades, ye FORESTS, the deluded heart
To heavenly meditation still have called,
And ev'ry song that glorified your God
Have heard with eager gladness! Ye with joy,
Fresh from his Maker's hand, when *Man* arose
Saw him in wond'ring homage kneel—ye bade
Your yet unpractised echoes swell the sound,
High as the ETERNAL's throne, when praise first broke
The silence of the new-created world!
Ye when with bloody arm infuriate Rome,
Pagan or papal from the haunts of men,
Chaced the firm band, whom Truth forbade to yield,
Crouch to her priests, and worship at her nod,
Ye screened their flight—with hospitable gloom
Sheltered their miseries, and with mingling boughs,
Vocal to a pray'r, a sylvan fane supplied!
O yet, even yet, your sacred influence breathe,
Oft as I tread your leaf-grown paths to rest,
Lull each tumultuous wish—with reverend awe
My heart inspire—and your stately growth
Pursues its heaven-directed aim—exalt
My thoughts from earth, and point them to the skies!

Nature having perfected her seeds, her next care

is to disperse them: the seed cannot answer its purpose while it remains confined in the capsule. After the seeds, therefore, are ripened, the pericarpium opens to let them out; and the opening is not like an accidental bursting, but, for the most part, is according to a certain rule in each plant. Some seeds which are furnished with hooks or spines, attach themselves to the rough coats of animals, and thus promote their dispersion. Others are contained in berries, and, being swallowed by birds, are again committed, without injury, to the earth in various places.—See T.T. for 1814, p. 269, and for 1815, p. 296.

Hips, haws, sloes, and blackberries, now adorn our hedges; and the berries of the barberry *(berberis vulgaris)*, bryony *(tamus communis)*, honeysuckle, elder, holly, woody-nightshade, and privet *(ligustrum vulgare)*, afford a valuable supply of food for many of the feathered race, while passing their winter with us.

About the middle of the month, the common martin disappears; and, shortly afterwards, the smallest kind of swallow, the sand-martin, migrates. The Royston or hooded crow *(corvus cornix)* arrives from Scotland and the northern parts of England, being driven thence by the severity of the season. It destroys lambs, and young partridges and moor fowl, and is almost as mischievous as the raven. The *woodcock* returns, and is found on our eastern coasts.

Various kinds of *waterfowl* make their appearance; and, about the middle of the month, *wild geese* leave the fens, and go to the rye lands, to devour the young corn. *Rooks* sport and dive, in a playful manner, before they go to roost, congregating in large numbers. *Stares* assemble in the fen countries, in vast multitudes, and, perching on the reeds, render them unfit for thatching, and thus materially injure the property of the farmer.

The ground is covered, about this time, with spiders' webs, crossing the path from shrub to shrub, and floating in the air. This *gossamer* appearance is noticed at length in T.T. for 1817, p. 298.

Among the *flowers* which are still usually in blow, in this month, is the holy-oak, Michaelmas daisy, stocks, nasturtian, marigold, mignionette, lavender, wall-flower, red hips, china rose, virginia stock, heart's ease, laurustinus, rocket, St. John's wort, periwinkle, &c. The hedges are now ornamented with the wreaths and festoons of the scarlet berries of the black briony; and now and then, that last 'pale promise of the waning year,' the *wild rose,* meets the eye.

As flowers now decay, and the bees cannot procure any farther support, this is the season for taking the honey. To obtain this precious article, the industrious collectors are usually destroyed with the fumes of burning brimstone. See a pretty 'Elegy to the Bee,' by Dr. Wolcott, in T.T. for 1817, p. 303.

The weather in October is peculiarly favourable to the *sports of the field,* and hunting and coursing are now at their height, as little damage is committed on the farmer's grounds after the gathering of the harvest.

HUNTING SONG.

Waken lords and ladies gay,
On the mountain dawns the day,
All the jolly chace is here,
With hawk, and horse, and hunting spear;
Hounds are in their couples yelling,
Hawks are whistling, horns are knelling;
Merrily, merrily, mingle they,
'Waken lords and ladies gay.'

Waken lords and ladies gay,
The mist has left the mountain gray,
Springlets in the dawn are streaming,
Diamonds on the brake are gleaming;
And foresters have busy been,
To track the buck in thicket green;
Now we come to chaunt our lay,
'Waken lords and ladies gay.'

Waken lords and ladies gay,
To the green wood haste away;
We can show you where he lies,
Fleet of foot and tall of size;
We can show the marks he made,
When 'gainst the oak his antlers frayed;
You shall see him brought to bay:
'Waken lords and ladies gay.'

Louder, louder, chaunt the lay,
Waken lords and ladies gay!
Tell them youth, and mirth, and glee,
Run a course as well as we;
TIME, stern huntsman! who can baulk,
Staunch as hound, and fleet as hawk?
Think of this, and rise with day,
Gentle lords and ladies gay.

WALTER SCOTT.

The taking of wild-fowl commences, by Act of Parliament, on the 1st of October, and the *decoy*-business is at the greatest height about the end of the month. Great numbers of wild ducks and other waterfowl are annually caught in the extensive marsh lands of Lincolnshire in this way.—See T.T. for 1814, p. 275.

The principal harvest of *apples* is about the beginning of this month; and the counties of *Herefordshire*, Worcestershire, Somersetshire, and Devonshire, are busily employed in the making of *cyder* and *perry*. Herefordshire is particularly famous as a cider country. October is the great month for brewing beer, whence the name applied to very strong beer of OLD OCTOBER. In this month also is the great *potatoe* harvest. The corn harvest being over, the stone-pickers go out again.

The sowing of wheat is generally completed in this month: when the weather is too wet for this occupation, the farmer ploughs up the stubble fields for winter fallows. Acorns are sown at this season, and the planting of forest and fruit trees takes place.

To sowe wheat and rie awhile take the paine,
In this monthes beginning for feare of the raine:
Scowre diches and pondes, set apples and plommes,
Peares, walnuts, and filberds, for time goes and commes.
Let warme meates suffise thee,
And tread drie I advise thee.

As heere Apolls, Pythen quels,
Whose poysoned paunch with bane abounds,
So flee from those who inward swells
With cancred grudge, that all confounds.

From 'Walton's Angler,' a delightful book to all admirers of simplicity of manners and rustic scenery, as well as to *mere* anglers, we select the following pretty

ANGLER'S SONG.

Oh the gallant fisher's life,
It is the best of any;
'Tis full of pleasure, void of strife,
And 'tis beloved by many.
Other joys
Are but toys;
Only this
Lawful is:
For our skill
Breeds no ill,
But content and pleasure.

In a morning up we rise
Ere Aurora's peeping,
Drink a cup to wash our eyes,
Leave the sluggard sleeping;
Then we go
To and fro,—
With our knacks
At our backs,—
To such streams
As the *Thames*,
If we have the leisure.

When we please to walk abroad,
For our recreation,
In the fields is our abode,
Full of delectation;
Where in a brook,
With a hook,
Or a lake,
Fish we take,

There we sit
For a bit,
Till fish we entangle.

We have gentles in a horn,
We have paste and worms too,
We can catch both night and morn,
Suffer rain and storms too;
None do here
Use to swear;
Oaths do fray
Fish away;
We sit still,
And catch our quill,
Fishers must not wrangle.

If the sun's excessive heat
Make our bodies swelter,
To an osier edge we get,
For a friendly shelter;
Where in a dyke—
Pearch or *pike*,
Roach or *dace*,
We do chace,
Bleak or *gudgeon*,
Without grudging,
We are still contented.

Or, we sometimes pass an hour
Under a green willow,
That defends us from a shower,
Making earth our pillow;
Where we may
Think or pray,
Before death
Stops our breath;
Other joys
Are but toys,
And to be lamented.

DESCRIPTION OF FRUIT TREES.

[Continued from p. 245.]

THE VINE (*vitis vinifera.*)—This is not generally reputed to be a tree, but rather a trailing shrub, though in its wild state it often grows to a considerable size; so large, indeed, that it was anciently found sufficient to make a statue of Jupiter, and to form columns for the temple of Juno. In general, we

cannot expect vines that are pruned and dressed to attain this enormous size; the vigour of the stock being transfused into the branches, and consumed in bearing the fruit. The climate of England is very unfavourable to the growth and longevity of the vine, though, when planted in a genial soil and situation, it will attain an amazing size and expansion even in this country. The situations in which the antients used to plant their vines are alluded to in the following lines from Virgil:

> Not every plant on every soil will grow:
> The sallow loves the watery ground and low;
> The marshes, alders: nature seems t' ordain
> The rocky cliff for the wild ash's reign;
> The baleful yew to northern blasts assigns;
> To shores the myrtles, *and to mounts the vines.*

The soil to be chosen for the vineyards is thus elegantly described by the same poet:

> But where the soil, with fatt'ning moisture filled,
> Is clothed with grass and fruitful to be tilled,
> Such as in cheerful vales we view from high;
> Which dripping rocks with rolling streams supply,
> And feed with ooze, where rising hillocks run
> In length, and open to the southern sun;
> Where fern suceeeds, ungrateful to the plough,
> That gentle ground to generous grapes allow;
> Strong stocks of vines it will in time produce,
> And overflow the vat with friendly juice.
>
> DRYDEN.

The vine has been cultivated ever since the time of Noah, and is the subject of many scriptural as well as classical allusions. The *Muscadine* and the *Frontiniac* sorts have been recommended for making a vineyard in England. The first is an excellent grape, ripening in September, and yielding a rich vinous juice. It is white, but when perfectly ripe, turns to an amber colour. The bunches sometimes weigh six or seven pounds; and the vine is remarkable for its large and strong wood and leaves. The *Red* Frontiniac is an excellent grape when fully ripe, but it

seldom arrives to maturity without artificial heat, except in warm seasons. These two kinds, with the *White* Muscadine, are the best adapted to this country; where it is well known that grapes are now principally produced by means of artificial heat. The most excellent kinds of foreign grapes are the *Malmsey* Muscadine, which has a very sweet and highly flavoured juice, with a strong taste of musk. The *Red* Muscadel: the fruit is of a beautiful red colour, with a thick skin and hard flesh something like the Raisin grape. The bunches frequently weigh six or seven pounds, and are most elegantly formed of equal berries. The Black *Damascus* grapes are large, round, black, thin-skinned, and have a delicate, rich juicy pulp, of an exquisite flavour. The same bunch often contains grapes of different sizes, the small having no stones, and the large only one. On these accounts, though a late ripener, it is a most excellent and valuable sort. The Black *Alicant*, which is sometimes called the Lombardy grape, is a good sort, though the skin is thick, and the seeds are large. The Black *Lisbon* is a good grape, but inferior to the large Black Cluster grape, from which the famous port wine is made. The *Aleppo* grape is distinguished by its middle size, roundness, thin skin, and exquisite flavour. It is sometimes white, and sometimes black, and generally striped in the same bunch. Sometimes one half is white and the other black; and the colours never intermix, but are divided by straight lines. The Genuine *Tokay* grape is white, sets close on the bunch, and is of a moderate size. The skin is thin, and the pulp delicate, abounding with a very agreeable juice. The *Claret* grape is small and black, growing in small bunches. The juice is somewhat of a blood colour, and harshly tasted when not mature.

The *Syrian* grape is large, white, and oval, with a thick skin, and a firm hard flesh. The bunches are well formed and enormously large. It is very prolific, and, when well perfected, may be called a very

eatable fruit, and can be kept many weeks longer than any other sort. This is the kind of grape which the twelve spies, who were sent by Moses to view the land of Canaan, cut down by the brook of Eshcol, and bare between two upon a staff (Numb. xiii, v. 28). How large the bunch might be, we are not told; but Strabo, the antient heathen geographer, testifies that the vines in Margiana (in Asia) and other places were so large, that two men could scarcely compass them with their arms, and that they produced bunches of grapes two cubits or *a yard long*. A modern writer informs us that Crete, Chios, and other islands of the Grecian Archipelago, afford bunches of *ten*, and sometimes of *thirty-six* or *forty pounds* weight. Even in this country, a bunch of the Syrian grape was produced at Wellbeck, and weighed *nineteen* pounds. Ignorant persons, judging from the ordinary size of a bunch of grapes, have ridiculed the representation of conveying a single bunch between two men. Supposing the branch with its cluster to have weighed forty or fifty pounds, it *might* certainly have been carried by one man; but as it was intended to be shown to the Israelitish people as a specimen, it was unquestionably necessary to employ two men to preserve it whole and uninjured. Accordingly, when the late Duke of Portland sent his large cluster of *Syrian* grapes as a present to the Marquis of Rockingham, it was carried more than twenty miles on a staff, by four labourers, two of whom bore it in rotation. Its greatest diameter was nineteen inches and a half, its circumference four feet and a half, and its length nearly twenty-three inches.

The *Currant* vine is remarkable for producing grapes which have no seeds, and are dried and exported under the name of *Sultana* Raisins, which are in high esteem. There are two methods of curing raisins. The first is by cutting the stalks of the bunches half through when the grapes are almost ripe, and leaving them suspended on the vine. The sun

candies them in this state, and when they become dry they are packed up in boxes. The second method is, when the vines are pruned, to preserve all the tendrils till the next vintage. A great fire is then made, in which the tendrils are burnt; a ley then made of their ashes, in which the newly gathered grapes are dipt, and then hung up in the sun to dry.

The partiality and aversion of the vine for some particular plants near which it will not thrive, are thus poetically noticed by an elegant writer:

> The prudent will observe what passions reign
> In various plants (for not to man alone,
> But all the wide creation, Nature gave
> Love and aversion): everlasting hate
> The *Vine* to *Ivy* bears, nor less abhors
> The *Colewort's* rankness, but with amorous twine
> Clasps the tall *Elm*.

The partiality of the vine for the elm gave rise to the practice of training the former in festoons, over corn and other fields, from one tree to another. This is still a common custom in Lombardy, Tuscany, the neighbourhood of Naples and other parts of Italy. Nothing can be imagined more beautiful than the pendent foliage and fruit of the vine, offering the most agreeable shade from the rays of the Sun, and enabling the traveller to contemplate the charming scenery around him, in the midst of the most refreshing coolness. There, to use the words of Lord Byron, are

> —— *Vines* (not nailed to walls) from tree to tree
> Festooned, much like the back scene of a play
> Or Melodrame, which people flock to see,
> When the first act is ended by a dance
> In vineyards copied from *the south of France!*

From the same circumstance, Catullus has taken his beautiful comparison for the state of a single female:

> As on the naked plain th' unwedded vine
> Nor lifts the head nor forms the generous wine,
> But sinking with its weight its tallest shoot
> Reflected, bends to meet the distant root;

Unhonoured, sterile, and forlorn it stands,
Untilled by lab'ring steers or rustic hands;
But should a husband *Elm*[1] its aid extend,
Both lab'ring steers and rustic hinds attend!

Although, as we have already stated that the best English grapes at the present time are those *forced* in hot-houses, it is sufficiently apparent that, at one time, *vineyards* were very common in England; and that wine, in very considerable quantity, was made from them. Tacitus states that vineyards were planted by the Romans in Britain; and Holinshed quotes the permission given by Probus to the natives to cultivate the vine, and make wine from it. The testimony of Bede; the old notices of *tithe* on wine, which were common in Kent, Surrey, and other southern counties; the records of suits in the ecclesiastical courts; the supposed patches of ground attached to numerous abbeys, which still bear the names of vineyards; the plot of ground called East Smithfield, which was once converted into a vineyard, and held by four successive constables of the Tower, in the reigns of Rufus, Henry, and Stephen, 'to their great emolument and profit,' seem to remove all doubt on this question. The Isle of Ely was named, in the early times of the Normans, 'Ile de Vignes,' the Bishop of which received three or four tuns of wine yearly for his tenth. So late as the reign of Richard II, the little park at Windsor was appropriated as a

[1] The following translation from the Greek Anthology conveys the same idea:

See yonder blushing vine-tree grow,
And clasp a dry and withered plane,
And round its youthful tendril throw
A shelter from the winds and rain.

That sapless trunk in former time
Gave covert from the noontide blaze,
And taught the infant shoot to climb,
That now the pious debt repays.

And thus, kind powers, a partner give
To share in my prosperity;
Hang on my strength while yet I live,
And do me honour when I die.

vineyard, for the use of the castle; and William of Malmsbury asserts, that the vale of Gloucester produced, in the twelfth century, as good wine as many of the provinces of France. 'There is no province in England hath so many or such good vineyards, as this country, either for fertility or sweetness of the grape; the wine whereof carrieth no unpleasant tartness, being not much inferior to French in sweetness.' It is remarkable enough, that in a park near Berkeley, in Gloucestershire, tendrils of vines are found springing up yearly among the grass, from one of which a cutting is now flourishing in the garden of Sir Joseph Banks. But wine is known to have been made in England at a much more recent period. Among the MS. notes of the late Peter Collinson (to whom the European world is indebted for the introduction of some of its choicest plants), is the following memorandum: 'Oct. 18th, 1765, I went to see Mr. Roger's vineyard, at Parson's-green, all of Burgundy grapes, and seemingly all perfectly ripe. I did not see a green half-ripe grape in all this great quantity. He does not expect to make less than fourteen hogsheads of wine. The branches and fruit are remarkably large, and the vines very strong.' These facts completely set aside the idea that the vineyards of England were apple-orchards, and that the wine was cider.

The only regular vineyard now in England is at *Appuldurcombe*, in the Isle of Wight. It was raised by Sir *Richard Worsley*, under the inspection of a French vine-dresser. The grapes produce a light white wine, and the novelty of this plantation has attracted many spectators. Of late years, however, there has been so scanty a portion of sunshine in our summers, that, until the last, all sorts of fruit have failed; so that grapes could not be expected to succeed. And although a few kinds may bear well upon walls, and in very warm situations, it is evident that they can never be generally cultivated in our fields in the present state of our climate.

NOVEMBER.

THE Saxons called November *wint-monat*, or wind-month, on account of the prevalence of high winds in this month.

Remarkable Days

In NOVEMBER 1819.

1.—ALL SAINTS.

IN the early ages of Christianity the word *saint* was applied to all *believers*, as is evident in the use of it by Saint Paul and Saint Luke; but the term was afterwards restricted to such as excelled in Christian virtues. In the Romish church, holy persons canonized by the Pope are called *saints*, and are invoked and supplicated by the professors of that religion. The church of England instituted this festival in memory of all good men defunct, proposing them as patterns for Christian imitation, but not allowing any prayers to be addressed to them.—For some rural customs on this day, see T.T. for 1814, pp. 278-9.

Nearly the same tricks are played among the young people in Ireland on Allhallows eve, as Burns describes in Scotland, in his poem upon that subject. If a stranger come into a farm-house where any of the usual occupations are going forward, such as making cheese or churning butter, and omit to say '*God bless your work*,' and the work should afterwards go wrong, it is all ascribed to this omission, and the poor visitor is terribly execrated.

2.—ALL SOULS.

In Catholic countries, on the eve and day of All Souls, the churches are hung with black; the tombs are opened; a coffin covered with black, and surrounded with wax lights, is placed in the nave of the

church, and, in one corner, figures in wood, representing the souls of the deceased, are halfway plunged into the flames.

It is a custom at *Naples*, on All Souls-day, to throw open the charnel-houses, lighted up with torches, and decked out with all the flowery pageantry of May-day: crowds follow crowds through these vaults to behold the coffins, nay, the bodies of their friends and relations; the floors are divided into beds, like a garden, and under these heaps of earth the corpses are laid in regular succession. The place is perfectly dry, for the soil is rather a pounded stone than earth, and parches up the flesh completely in a twelvemonth: when that period is elapsed, the body is taken up, drest in a religious habit, and fixed like a statue in a niche. Many retain a horrid resemblance to what they were when animated, and some show strong marks of agony in their distorted features.

*2. 1600.—RICHARD HOOKER DIED,

The venerable author of the '*Ecclesiastical Polity*.' This work has ever been admired for soundness of reasoning, and prodigious extent of learning; and the author has universally acquired from it the honourable titles of 'the judicious,' and 'the learned.' Cardinal Alen and Dr. Stapleton, being in Italy when it was published, are said to have told the Pope (Clement VIII), that, 'though His Holiness had not yet met with an English book, as he was pleased to say, whose writer deserved the name of an author, yet there now appeared a wonder to them, and so they did not doubt it would appear to His Holiness, if it was in Latin; which was, that 'a poor obscure English priest had written four such books of law and church polity, in so majestic a style, and with such clear demonstrations of reason, that in all their readings they had not met with any thing that exceeded him.' This creating in the Pope

a desire to know the contents, Stapleton read to him the first book in Latin; upon which the Pope said: 'there is no learning that this man hath not searched into; nothing too hard for his understanding. This man indeed deserves the name of an author. His books will get reverence by age; for there are in them such seeds of eternity, that, if the rest be like this, they shall continue till the last fire shall devour all learning.'

Hooker's Life, by Izaac Walton, forms one of those five pieces of biography, so well edited by Dr. Zouch.

5.—KING WILLIAM LANDED.

The glorious revolution of 1688 is commemorated on this day, when the throne of England became vested in the illustrious House of Orange. Although King William landed on the 5th of November, the almanacks still continue the mistake of marking it as the *fourth*.

5.—POWDER PLOT.

This day is kept to commemorate the diabolical attempt of the Papists to blow up the Parliament House.[1] The best account of this nefarious transaction is detailed in Hume's History of England, vol. vi, pp. 36-38 (8vo edition, 1802.)—See also T.T. for 1814, p. 280.

6.—SAINT LEONARD.

Leonard, or *Lienard*, was a French nobleman of great reputation in the court of Clovis I; he was instructed in divinity by Remigius, Bishop of Rheims, and afterwards made Bishop of Limosin. Several miraculous stories are told of him by the monks, not worth relating. He died about the year 559, and has always been implored by prisoners as their guardian saint.

[1] In the neighbourhood of Kentish Town is *Traitor's Hill*, from the elevated summit of which, commanding a distinct view of the proposed scene of destruction, Catesby and Piercy, with other *Traitors*, it is said, stood in expectation of witnessing the horrible event.

*6. 1817.—PRINCESS CHARLOTTE OF WALES DIED.

The most minute particulars relative to our late beloved princess being universally known, we refrain from the attempt to add any thing to the accounts of her estimable life and afflicting death, already published; but shall content ourselves with culling from the 'CYPRESS WREATH,' twined by the bards of Britain to her immortal memory, one other sweet poetic flower expressive of feelings in which every reader must participate.—(See also p. 5.)

The COBOURG ROSE.

Of fragrant scent, and charming hue,
In Britain's royal garden grew
A lovely Rose;
And, as he passed th' enchanting place,
COBOURG the blushing flower to grace
His bosom chose.

Still blooming in the royal bound,
The plant remained, but fenced around
New buds to bear;
Phœbus with genial glory smiled,
And zephyrs only, sweet and mild,
Waved thro' the air.

The Rose *did* bud; yet ere the day
Which should its beauteous hue display,
By Heaven's command
DEATH passed that way, in rueful hour,
And sudden snatched both bud and flower
With icy hand.

For blooming youth, and mental worth,
We drop the pitying tear on earth,
But look above
With eye of hope; for well we know
Death oft removes his flowers to grow
In realms of love.

Yes; there's a better world on high,
A garden planted in the sky,
For ever fair:
Still CHARLOTTE and her Son may reign
Thro' grace divine; nor Death, nor Pain,
Can enter there.

9.—LORD MAYOR'S DAY.

The word *mayor*, if we adopt the etymology of Verstegan, comes from the antient English *maier*, able or potent, of the verb *may* or *can*. King Richard I, A.D. 1189, first changed the bailiffs of London into Mayors; by whose example others were afterwards appointed. See our last volume, p. 278, for some lines on this day.

11.—SAINT MARTIN.

He was a native of Hungary, and for some time followed the life of a soldier; but afterwards took orders, and was made Bishop of Tours in France, in which see he continued for twenty-six years. Martin died about the year 397, much lamented, and highly esteemed for his virtues.—For a pleasing little ballad on this day, see T.T. for 1814, p. 286; and our last volume, p. 315.

13.—SAINT BRITIUS.

Britius, or Brice, succeeded St. Martin in the bishopric of Tours in the year 399. He died in 444.

*13. 1817.—COUNTESS OF ALBEMARLE DIED.

The following letter, written at an early age, and accompanied with a bust of Fox, was sent to Lady Albemarle by H. R. H. the Princess Charlotte, who distinguished her ladyship by peculiar marks of affection, regard, and esteem.

'My dear Lady Albemarle,

'I most heartily thank you for your very kind letter, which I hasten to answer. But I must not forget that this letter must be a letter of congratulations, of congratulations the most sincere: I love you, and therefore there is no wish I do not form for your happiness in this world.

'May you have as few cares and vexations as can fall to the lot of man; and may you long be spared, and long enjoy the blessing of all others the most precious—your dear Mother*—who is not more precious to you than to me. But there is a trifle which accompanies this, which I hope you will like; and if it sometimes reminds you of me, it will be a great source of pleasure to me. I

* Lady de Clifford, one of her H. R. H.'s preceptresses.

shall be most happy to see you, for it is a long time since I had that pleasure.

'Adieu, my dear Lady Albemarle, and believe me ever

'Your affectionate and sincere friend,

'CHARLOTTE.'

It is painful to add, that the demise of the estimable Countess is supposed to have arisen purely from sympathy, at the sudden and unexpected fate of the Princess, her amiable and exalted friend. Her ladyship's *accouchement* was not expected until the lapse of a few weeks; but, melancholy to relate, exactly seven days after the death of the illustrious Charlotte, and but three or four after the communication of the fatal intelligence, Lady Albemarle also was no more!

*13. 1817.—RT. HON. J. P. CURRAN DIED.

When Curran was called to the bar, he was without friends, without connexions, without fortune, conscious of talents far above the mob by which he was elbowed, and suffering under a sensibility which rendered him painfully alive to the mortifications he was fated to experience. After toiling for a very inadequate recompense at the sessions of Cork, and wearing, as he said himself, his teeth almost to their stumps, he proceeded to the metropolis, taking for his wife and young children a miserable lodging upon Hog-hill. Term after Term, without either profit or professional reputation, he paced the hall of the Four Courts. The first fee of any consequence that he received, was through the recommendation of Mr. Arthur Wolfe, afterwards the unfortunate but respected Lord Kilwarden. Curran's recital of this incident cannot be without its interest to the young profes sional aspirant, whom a temporary neglect may have sunk into dejection. 'I then lived,' said he, 'upon Hog-hill; my wife and children were the chief furniture of my apartments; and as to my rent, it stood pretty much the same chance of its liquidation with

the national debt. Mrs. Curran, however, was a barrister's lady, and what was wanted in wealth she was well determined should be supplied by dignity. The landlady, on the other hand, had no idea of any gradation except that of pounds, shillings, and pence. I walked out one morning to avoid the perpetual altercations on the subject, with my mind, you may imagine, in no very enviable temperament. I fell into the gloom to which from my infancy I had been occasionally subject. I had a family for whom I had no dinner, and a landlady for whom I had no rent. I had gone abroad in despondence—I returned home almost in desperation. When I opened the door of my study, where Lavater alone could have found a library, the first object which presented itself was an immense folio of a brief, 20 golden guineas wrapped up beside it, and the name of *Old Bob Lyons* marked upon the back of it. I paid my landlady, bought a good dinner, gave Bob Lyons a share of it; and that dinner was the date of my prosperity!' Such was his own exact account of his professional advancement.—*Phillips's Life of Curran.*

*14. 1804—JACOB BRYANT DIED, ÆT. 99.

He employed his deep and extensive learning in the noblest of purposes: he most deservedly ranks among the first men of his age; and, from having consecrated his great talents and acquisitions to the service of religion, will be ever entitled to the veneration of mankind.

17.—SAINT HUGH.

Our saint was a native of Burgundy, or Gratianopolis. At first he was only a regular canon, but afterwards a Carthusian monk, and at length, through the favour of King Henry II, was constituted Bishop of Lincoln. In this see he obtained great fame, not only for his extraordinary austerity of life and excellent economy, but for his rebuilding the cathedral from the foundation. Hugh died on this day, in the year 1200, of an ague. In 1220, he was canonized

at Rome, and his remains were taken up October 7, 1282, and deposited in a silver shrine.

20.—EDMUND, KING AND MARTYR.

Edmund, king of the East-Angles, having been attacked by the Danes in 870, and unable to resist them, heroically offered to surrender himself a prisoner, provided they would spare his subjects. The Danes, however, having seized him, used their utmost endeavours to induce Edmund to renounce his religion; but, refusing to comply, they first beat him with clubs, then scourged him with whips, and afterwards, binding him to a stake, killed him with their arrows.

22.—SAINT CECILIA.

Cecilia was a Roman lady, who, refusing to renounce her religion, was thrown into a furnace of boiling water, and scalded to death. Others say that she was stifled in a bath, a punishment frequently inflicted, at that time, on female criminals of rank. She suffered martyrdom about the year 225. Cecilia is regarded as the patroness of music, and is represented by Raffaelle with a regal in her hand.

23.—SAINT CLEMENT.

Clement I was born at Rome, and was one of the first bishops of that place: this see he held about sixteen years; from the year 64 or 65 to 81. He was remarkable for having written two Epistles, so excellent, and so highly esteemed, by the primitive Christians, that the first was for some time considered canonical. Clement was sentenced to work in the quarries, and afterwards, having an anchor fastened about his neck, was drowned in the sea.

23.—O. MART.

Old Martinmas-Day, an antient quarter-day.

25.—SAINT CATHERINE.

Our saint was born at Alexandria, and received a liberal education. About the year 305, she was converted to Christianity, which she afterwards professed with the utmost intrepidity, openly reproving the

pagans for offering sacrifices to their idols, and upbraiding the Emperor Maxentius, to his face, with the most flagrant acts of tyranny and oppression. She was condemned to suffer death by rolling a wheel over her body stuck round with iron spikes.

27.—ADVENT SUNDAY.

This and the three subsequent Sundays which precede the grand festival of Christmas take their name from the Latin *advenire,* to come into; or from the word *adventus,* an approach.

30.—SAINT ANDREW.

Andrew was the son of James, a fisherman at Bethsaida, and younger brother of Peter. He was condemned to be crucified on a cross of the form of an X; and, that his death might be more lingering, he was fastened with cords. The *Order of the Thistle* is described in our last volume, p. 283.

Astronomical Occurrences

In NOVEMBER 1819.

THE Sun enters Sagittarius at 36 m. past 2 in the morning of the 23d; and he rises and sets during this month as stated in the following

TABLE

Of the Sun's Rising and Setting for every fifth Day.

November 1st, Sun rises	12	m. after	7.	Sets	48	m. past	4
6th,	20		7		40		4
11th,	29		7		31		4
16th,	37		7		23		4
21st,	44		7		16		4
26th,	51		7		9		4

Equation of Time.

From the apparent time, as indicated by a good sun-dial, subtract the following quantities, and the remainders will be the mean time corresponding to these several epochs.

TABLE.			m.	s.
Monday,	Nov. 1st,	from the time by the dial *subtract*	16	15
Saturday,	6th,		16	14
Thursday,	11th,		15	52
Tuesday,	16th,		15	8
Sunday,	21st,		14	3
Friday,	26th,		12	39

Phases of the Moon.

Full Moon,	2d day,	at 32 m.	after 3	morning.
Last Quarter,	9th,	19	11	night.
New Moon,	17th,	41	5	afternoon.
First Quarter,	24th,	5	1	

Moon's Passage over the Meridian.

The Moon will pass the first meridian at the following times in the course of this month; which will afford convenient opportunities for observation, if the weather prove favourable: viz.

November	9th, at	53 m. after	5 in the morning.
	10th,	38	6
	11th,	20	7
	12th,	1	8
	22d,	45	4 in the evening.
	23d,	41	5
	24th,	32	6
	25th,	20	7
	26th,	6	8
	27th,	52	8
	28th,	38	9
	29th,	26	10

Phase of Venus.

Nov. 1st	Enlightened part	11·94161 digits.
	Dark part	0·65839

Eclipses of Jupiter's Satellites.

The following are the eclipses of Jupiter's first and second satellites, which will be visible at the Royal Observatory this month: viz.

EMERSIONS.

1st Satellite	6th day, at	21 m. after	6	evening.
	13th,	17	8	
	29th,	38	6	
2d Satellite	7th,	2	8	

Other Phenomena.

Jupiter will be in quadrature at 45 m. after 10 in the evening of the 1st of this month. The Moon will be in conjunction with β in Taurus at 7 m. after 8 in the morning of the 5th; with Pollux at 58 m. after 6 in the evening of the 7th; with Spica in Virgo at 3 m. after 6 in the morning of the 15th; and with α in Scorpio at 30 m. past 3 in the afternoon of the 18th.

On the EFFECTS *of* GRAVITATION.

[Continued from p. 269.]

Among the effects of gravitation on terrestrial bodies, there is none more astonishing, or more demonstrative of its power, than the periodic flux and reflux of the ocean; nor, amongst all the inquiries which relate to these effects, is there one more interesting than that which relates to the *Tides*. The weight of bodies; their descent to the surface of the Earth when unsupported; their deflection from the direction of their projectile motions, when these are not perpendicular to the surface of the Earth; and the vibrations of the pendulum, are so many striking proofs of the universal influence of terrestrial gravity; while the variations in these at different points of the Earth's surface afford strong indications of its figure, and even furnish a ground-work for the application of science, by which we are enabled to attain conclusions relative to the ratio of the equatorial and polar diameters. But the phenomena of the tides afford the nearest and most striking proof we possess of the gravitation of terrestrial matter towards the celestial bodies.

The tides are produced by the action of the heavenly bodies, particularly the Sun and Moon, upon the waters of the ocean. The varieties in the relative situations and motions of these bodies, and the inclination of their orbits compared with the plane

of the equator, produce inequalities in the tides, which modern investigation has been able to trace to their corresponding causes, and thus to apply these irregularities themselves to the establishment of the general theory; and prove that the tides, as well as the inequalities to which they are subject, are the necessary effects of universal gravitation.

If the waters of the sea covered the whole surface of the Earth to an equal depth, and experienced the action of gravity only, without any disturbing influence from the motion of the Earth, they would take a spherical form: but, on account of the rotary motion of the Earth, they ought to assume the form of an ellipsoid of revolution, the axis of the Earth being its minor axis. If the force of gravity combined with the centrifugal force, arising from the diurnal rotation of the Earth, were the only forces which acted upon the waters of the ocean, the ellipsoid would finally attain a state of stability, and its form would, in consequence, undergo no farther alteration. But, as the sea is also subject to the action of the Sun, it gravitates towards that body, each of its molecules being attracted in proportion to its distance from that luminary: supposing the Sun to be in the plane of the equator, this plane would then no longer retain its circular form, but become elliptic; the parts immediately beneath the Sun being raised above the other by his direct influence upon them, while those on the opposite side, being less attracted than the intermediate parts, would yield more freely to the influence of the centrifugal force resulting from the rotation of the Earth, and form the opposite part of the ellipse, which a section of the Earth through the equator would now exhibit. From this it follows, that there would result from the action of the Sun alone, two high and two low tides, the high tides being in the line of the Sun's action, or 180° from each other, and the low tides at right angles to this line, or at 90° from the first. If the Earth and the Sun had con-

stantly the same angular velocity, or moved together, the solar action would always be exerted upon the same point; and the relative positions of the elevated and depressed parts of the ocean, with respect to the other parts, would then be constant; but, as the Sun continually changes his position with respect to the Earth, in his apparent progress from east to west, the elevations and depressions of the waters which arise from the influence of his attraction, combined with the rotary motion of the Earth, experience the same change, and follow his motions. The two high tides, therefore, happen at the time of the Sun's passage over the meridian of that place, and over the opposite meridian, and the true low tides at the meridians that are 90° distant from these; and as the Sun passes over every point of the equator in the course of 24 hours, the interval between the two high tides would therefore be 12 hours, and the time of low water 6 hours distance from these. If the Sun remained constantly in the plane of the equator, as has been supposed, the waters would always be highest at the equator, and diminish gradually from thence to the poles, where there would be no elevation; but, as the Sun is sometimes on one side of the equator and sometimes on the other, the most elevated points of the ocean will follow the same course, and consequently be affected by his declination.

The Sun, however, is not the only body which acts upon the waters of the ocean, and gives rise to the phenomena of the tides; the Moon also produces her effect; and by supposing her to act alone, as has been done with respect to the Sun, the same reasoning may be applied to her effects as has been employed relative to the action of that luminary. If the action of these two bodies were independent of each other, there would be four high and four low tides every 24 hours, except when their actions were both exerted in the same direction, that is, when the luminaries were either in conjunction or opposition. But,

as the Sun and Moon move with different angular velocities, the directions of their influence are constantly varying; and hence the intervals between these high and low tides are also subject to equal variation. But these two effects are not produced independently of each other; and, therefore, the high tide is the effect of the combined action of both bodies; and, consequently, the place where the waters rise the highest, as well as the time when the maximum takes place, will not only depend upon the relative actions of these bodies, but also upon the directions in which their influence is exerted. When they act in the same direction, either both the same way or in opposition to each other, their united effect will be the greatest, and will then be the sum of the two separate effects; for, when their actions are diametrically opposed to each other, one of them coincides with that of the centrifugal force, and by this means produces the same effect as if it had united with the other. Under these circumstances, it is equally evident that their effect will be the least when they are at right angles to each other, as their separate effects will then destroy most of each other's influence. In any other situation, the magnitude and direction of their combined influence may readily be calculated.

For, since the masses of the Sun and Moon, and their distances from the Earth, as well as their directions at any given time, are known, their separate forces may be reduced into one compound force acting in the plane of the three bodies. As the attractive power is always directly as the mass and inversely as the square of the distance of the attracting body, each of these forces may be found and represented by a line drawn in this plane; and then the force and direction of their combined influence calculated from these. In the annexed figure, let E represent the Earth, S the place of the Sun, and M that of the Moon; and P the point upon which the greatest

combined action of the Sun and Moon is exerted; also, PM the direction and influence of the Moon, and PS those of the Sun; then by completing the parallelogram, and drawing the diagonal PA, it will represent the compound force required.

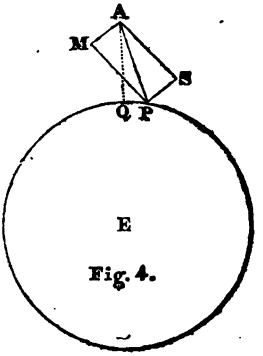


Fig. 4.

From the above data we know the values of PM and PS, and the angle MPS, made by the direction of the two bodies; and as MA and PS are parallel to each other, the angle MAP is equal to the angle APS; and, consequently, the sum of the two angles MAP and APM is equal to the whole angle MPS, and as this sum is known, the angle AMP is consequently given. In the triangle AMP, then, we have the two sides PM and MA (=PS), from which the side AP and the angle APM can readily be found: the former value will express the magnitude of the compound force, and the latter its direction, with respect to that of the Moon, which is previously known. Then, as the direction of this compound force with respect to one side of its plane has been found, and the inclination of that plane to the plane of the equator was previously known, this compound force may be reduced to one acting parallel to the plane of the terrestrial equator, as AQ; and its effect immediately combined with that resulting from the rotary motion of the Earth, in determining the position of the highest

point of the waters at the given instant, produced by the joint action of the Sun and Moon united with the effect of the centrifugal force.

The angular velocities of the two bodies being different, their effects will vary with their positions: they will be united in the syzygies when they produce the highest tides; but they must be subtracted from each other in the quadratures; and, consequently, the tides are then the least. The time of high water, according to the premises we have assumed, is, in the first case, the time of the passage of the two bodies over the meridian; and, in the quadratures, the time of flood is that of the passage of the body which exercises the greatest action. At all other periods, the time of high water is between the passages of the two bodies, but nearest to the passage of that which exercises the greatest force.

The mean interval between two consecutive passages of the Sun over any given meridian is a day; and the interval between two similar passages of the Moon is 1·03505 day. The interval of the conjunctions is 29·53059 days. At the moment of conjunction, the solar and lunar tides coincide with each other, and the compound tide is the greatest. At a period of 7·38264 days after this, the Sun and Moon being in quadrature, the compound tide is the least; because the full sea answering to the one, coincides with the low sea of the other. After an elapse of 14·76529 days from the conjunction, the bodies are in opposition, and the compound tide is again the highest, because it is the whole effect of their united action; and, at the end of 22·34795 days, the two bodies being in quadrature, their combined influence gives rise only to a small tide, because the effect of the one is again opposed to the other. At the expiration of 29·53059 days, the two bodies being again in conjunction, produce a high tide, as before. On this subject, the results of observation are in perfect coincidence with the deductions from theory, in-

dependent of the anomalies occasioned by the variations in the action of the Sun and Moon.

From the preceding explanation, it is evident that the greatest and least tides ought to follow the movement of that body which exerts the greatest action on the waters. If the solar tides, for instance, destroy the lunar, the times of high and low water ought to coincide with the time at which the solar tide would take place; but if the lunar effects destroy the solar, then the contrary must happen, and the least compound tide ought to correspond with the low solar tide; and consequently the time is a quarter of a day from that of the greatest compound tide: these data, therefore, furnish a simple method of ascertaining whether the solar or the lunar tide is the greatest. Observations show that the time of low water differs by a quarter of a day from that of high water, from which it follows that the action of the Moon surpasses that of the Sun. Laplace made many observations on the heights of the tides, and the intervals between them, at Brest, which is very favourably situated for this purpose, and found that the greatest total tide during each month was 5·888 metres, and the least 2·789 metres; these heights, therefore, are nearly as 2 : 1. From which it follows, that the action of the Moon is nearly three times as great as that of the Sun.

The height of the tides, as well as the times at which they happen, ought to vary in consequence both of the irregular motions of the Earth and the Moon in their orbits, and the inclination of the two orbits to each other. For by the movement of the Moon in her elliptic orbit, her distance from the Earth varies, and the same effect is produced with respect to the distance of the Earth from the Sun by its motion in its orbit; and as the action of gravity is in the inverse ratio of the squares of the distances from the attracting bodies, it follows that these irregular movements must cause the heights of the tides which result

from these attractions to vary also. If the orbits were in the same plane, the action of these two bodies would also be in the same plane; but the further their orbits deviate from this common plane, or the greater angle they make with each other, the more their forces will be opposed, and consequently the less will be their combined effect.

The time of high and low water depends upon the distance of the Sun from the resultant of the actions of the two bodies; this distance, which is nothing in the syzygies and quadratures, varies in all other positions in proportion to the angle formed by the radii vectores of the two bodies; and this angle varies with the distance of the Moon from the nodes of her orbit. From this, it results that the times of high and low water ought to vary with the inclination of the orbits, and also with the distance of the Moon from her nodes. As all these motions result from the action of gravity, it follows that this force is the efficient cause which produces the tides.

Since, then, both the height of the tides and the time of their recurrence vary according to the movements of the Earth and Moon in their respective orbits, and the inclination of these orbits to each other, and these are subject to periodic revolutions, it necessarily follows that the tides must also be subject to the same periodic variations. The period of these positions of the Sun and Moon with respect to the Earth, is about 223 lunar months, and therefore that of the tides must follow the same period: and as the revolution of the Earth with respect to the lunar nodes is 346·61995 days, during this interval there ought to be two very high and two very low tides. In the comparison which Laplace made of his results, calculated according to these principles, and the phenomena of the tides as actually observed at Brest, the results were found to agree with great precision.

In this explanation of the phenomena of the tides, it has been supposed that the sea covered the whole

globe, and that its depth was every where the same; and though this supposition greatly simplifies the consideration, it is not really the case; for not only is its surface greatly diversified with land, but its depth also presents the greatest variations; and both these modify the general conclusion which have been derived from the preceding theory. These, combined with local circumstances, often cause the tides at any given place not only to differ greatly from that which ought to result from the general theory, but also from the same phenomena, at places not very distant from it. The action of the Sun and Moon upon any space covered with water is the greater in proportion to the extent and depth of the fluid; for the impressions which each molecule of the fluid receives is communicated to the whole mass; and on this account the action of the Sun and Moon, which are insensible upon an insulated molecule, produce such remarkable effects on the whole ocean. Hence we perceive the reason why the flux and reflux are so small in narrow seas; as the Black sea, the Caspian, the Mediterranean, and the Baltic. The direction of the coasts, likewise, has a great influence upon the height and time of the flux in local situations; for when these oppose the general action of the waters, and confine them within certain limits, these waters must accumulate there, and both the height and duration of the tide be increased. The shape of the seas, the directions of their coasts, and their communications with each other, as well as their extent and depth, must also affect the height, the time of high water, and the duration of the tides; and when these are duly considered, and their particular effects fully estimated, they will be found sufficient to account for these anomalies in the phenomena, which constant observation establishes, and which therefore confirm the general theory and effects of gravitation rather than oppose them.

[To be continued.]

The Naturalist's Diary

For NOVEMBER 1819.

Dark is the morn, and thro' the air
The spirit of the tempests flies:
Nature, of late so bright and fair,
Adorned with flowers of thousand dyes,
All beauteous to the view,
Now, shrinking from the tyrant blast,
Appears a desolated waste,
And reads this lesson to the mind,—
Such is the fate of human kind,
So sorrowful, yet true.

The voice of melody, that late
Re-echoed to the listening grove,
Has it, alas! so short a date—
Is all on which we fix our love
So perishing and frail?
'Tis but as yesterday, the scene
In varied robes of cheerful green,
From early morn to closing day,
Looked rich, and beautiful, and gay,
And told a lovelier tale.

NOVEMBER comes—and at his call
The genius of the storm awakes:
Flowers fade, and leaves deciduous fall—
The vision flies—the enchantment breaks,
And vanishes away.
Now, drenched with cold and cheerless rains,
The Shepherd 'tends his fleecy care,
And wetshod traverses the plains,
Awhile with summer—beauty fair:
In his sad eye and aching breast,
In all—this moral stands confest,
That Life's a Summer's day.

NOVEMBER is, usually, a very gloomy month, yet there are some intervals of clear and pleasant weather: the mornings are, occasionally, sharp, but the hoarfrost is soon dissipated by the *Sun*, and a fine open day follows. The trees are now stripped of their foliage. See our last volume, p. 294. On the decay and fall of the leaf, see also T. T. for 1817, p. 333, and in the Naturalist's Diary, for October and

November, in our former volumes. A popular description of *Forest Trees*, alphabetically arranged, at the close of the different months, will be found in T. T. for 1816.

The Virginia-creeper *(hedera quinque-folia)* is particularly rich and beautiful in the autumnal months, with its leaves of every hue, from a bright to a dark green and deep crimson.

That highly-esteemed fish, the *salmon*, now ascends rivers to deposit its spawn in their gravelly beds, at a great distance from their mouths; thus described by an old poet:

> As when the SALMON seeks a fresher stream to find;
> Which hither from the sea comes, yearly, by his kind,
> As he tow'rds season grows; and stems the watery tract,
> Where Tivy, falling down, makes a high cataract,
> Forced by the rising rocks that there her course oppose,
> As tho' within her bounds they meant her to inclose:—
> Here, when the labouring fish does at the foot arrive,
> And finds that by his strength he does but vainly strive;
> His tail takes in his mouth, and, bending like a bow
> That's to full compass drawn, aloft himself doth throw;
> Then springing at his height, as doth a little wand,
> That bended end to end, and started from man's hand.

In this month, in the year 1817, which was a wet season and very mild, the garden was still gay with holyoaks, marigolds, periwinkle, wallflower, carnation, rose-campion, double daisy, purple primrose, scorpio senna, St. Johns wort, mignionette, Michaelmas daisy, golden rod, honeysuckle, rocket, veronica spicata, sweet pea, bog ranunculus, polyanthus, crysanthemums, hepaticas, and mezereon berries. The sallow also disclosed its grey hairy catkins, the hazel its male catkins, and the honeysuckles put out fresh leaf-buds. In the fields, the thistle and the knobweed displayed their rich purple flowers; the yellow of the charlock looked gay amid the green of the turnips, or upon the fallows; and the bramble showed its flowers along with its black berries in the hedges.

What were in summer 'the fallows grey' are now green with young rye and wheat. If the autumn and

early part of the winter continue very open, the wheat grows too luxuriantly, and gets what is called *winter-proud.* Frost, therefore, is very useful in checking this.

The CLOSE *of* SUMMER.

Farewel, ye banks, where late the *primrose* growing,
Among fresh leaves its pallid stars displayed,
And the *ground-ivy*'s balmy flowers blowing,
Trailed their festoons along the grassy shade.

Farewel! to richer scenes and Summer pleasures,
Hedge-rows, engarlanded with many a wreath,
Where the *wild roses* hang their blushing treasures,
And to the evening gale the *woodbines* breathe.

Farewel! the meadows, where such various showers
Of beauty lurked, among the fragrant *hay;*
Where *orchis* bloomed with freaked and spotted flowers,
And *lychnis* blushing like the new-born day.

The burning *dog-star,* and the insatiate *mower,*
Have swept or withered all this floral pride;
And *mullein*'s now, or *bugloss*' lingering flower,
Scarce cheer the green lane's parched and dusty side.

His busy sickle now the month's-man wielding,
Close are the light and fragile *poppies* shorn,
And while the golden ears their stores are yielding,
The azure *corn-flowers* fall among the corn.

The woods are silent too, where loudly flinging
Wild notes of rapture to the western gale,
A thousand *birds* their hymns of joy were singing,
And bade th' enchanting hours of Spring-time hail!

The *stock-dove* now is heard, in plaintive measure,
The *cricket* shrill, and *wether*'s drowsy bell;
But to the sounds and scents of vernal pleasure,
Music and dewy airs, a long farewel![1]

The stock-dove *(columba œnas),* one of the latest winter birds of passage, arrives from more northern regions, towards the end of this month. The females and young of the brown or *Norway rat* now leave their holes at the sides of ponds and rivers, to which they had betaken themselves in the spring, and repair

[1] *Conversations on Natural History, by C. Smith,* (vol. i, p. 189); a delightful book for young persons of either sex, but particularly adapted to females.

to barns, out-houses, corn-stacks, and dwellings. See T. T. for 1817, p. 338. *Moles* now make their nests, in which they lodge during the winter, and which are ready for depositing their young in the spring. These are distinguished by being of a larger size than the common mole-hill, and are lined with dried grass, leaves, &c.

The *woodman* now repairs to the woodlands to fell coppices, underwood, and timber. Some particulars of forest scenery, in this month, are noticed in our last volume, p. 297.

The RUSTIC COT.

Nor is that cot, of which fond fancy draws
This casual picture, alien from our theme.
Revisit it at morn; its opening latch,
Tho' penury and toil within reside,
Shall pour thee forth a youthful progeny
Glowing with health and beauty (such the dower
Of equal Heaven): see how the ruddy tribe
Throng round the threshold, and with vacant gaze
Salute thee; call the loiterers into use,
And form of these thy fence, *the living fence*
That graces what it guards. Thou think'st perchance
That, skilled in nature's heraldry, thy art
Has, in the limits of yon fragrant tuft,
Marshalled each rose, that to the eye of June
Spreads its peculiar crimson; do not err.
The loveliest still is wanting, *the fresh rose*
Of innocence it blossoms on their cheek,
And lo, to thee they bear it! striving each,
In panting race, who first shall reach the lawn,
Proud to be called thy shepherds. Want, alas!
Has o'er their little limbs her livery hung,
In many a tattered fold, yet still those limbs
Are shapely; their rude locks start from their brow;
Yet on that open brow, its dearest throne,
Sits sweet simplicity. Ah, clothe the troop
In such a russet garb as best befits
Their pastoral office; let the *leathern scrip*
Swing at their side, *tip thou their crook with vine*,
And braid their hats with rushes;
Assign his station: at the close of eve,
Be it their care to pen in hurdled cote
The flock, and when the matin prime returns,
Their care to set them free; yet watching still
The liberty they lend, oft shalt thou hear

Their whistle shrill, and oft their faithful dog
Shall with obedient barkings fright the flock
From wrong or robbery. The livelong day
Meantime rolls lightly o'er their happy heads;
They bask on sunny hillocks, or disport
In rustic pastime, while that loveliest grace,
Which only lives in actions unrestrained,
To ev'ry simple gesture lends a charm.

ENGLISH GARDEN.

The farmer usually finishes his ploughing this month. Cattle and horses are taken into the farm-yard; sheep are sent to the turnip-field; ant-hills are destroyed; and bees are put under shelter.

Now serveth the season to sowe wheate and rie,
At this monthe's beginning, in ground hot and drie:
Some labour bestowe your hedges to plash,
Your wood to cut downe, and chiefly your ash.
If stomach forsake thee,
Then tart receipts make thee.

You Misrulne Lordes make no delay
To packe your treasure under lockes;
But whosoever keepes the key,
Have care yourselves to garde the boxe.

DESCRIPTION OF FRUIT TREES.

[Concluded from p. 276.]

WALNUT-TREE *(juglans regia)*. — The walnut-tree is originally a native of Persia, and attains, in this country, the height of from fifty to sixty feet; having a beautiful erect trunk, that branches out into a large spreading crown, which is furnished with pinnated leaves. There are numerous varieties, generally raised for their palatable fruit, which ripens from the beginning of September till the end of October. The fruit of the walnut-tree is used at two different periods of its growth, when green for pickling, and in a ripe state at the dessert. For the former purpose, the nuts are fit in July or August, when they are about half or three-fourths grown. Wal-

nuts are ripe in the months of September and October, when they are usually beaten down by means of long poles.

No place of equal extent is supposed to possess so many valuable walnut-trees, as *Norbury Park* in Surrey, which, about a century ago, was said to contain nearly *forty thousand*. It is remarked as a proof of the uncertainty of their produce, that, in some years, six hundred pounds worth of walnuts have been gathered from the trees in this park, whereas, in others, they have yielded scarcely a single bushel. Croydon fair is remarkable for its profusion of walnuts.

The walnut-tree flourishes both in a rich as well as a chalky soil, and, when planted in rows, has a very respectable sppearance. The fruit, when fresh, is very grateful; it contains much oil. The juice of the green coat of the walnut will dye the skin of a tawny hue; an expedient resorted to by the gipsies, not only to give themselves a dingy appearance, but to disguise any child whom they may have enticed from its parents. The wood was formerly much used for furniture, as the bureaus and bedsteads of our grandfathers sufficiently attest: its place is now supplied by foreign articles.

DECEMBER.

DECEMBER was called *winter-monat* by the Saxons, but after they were converted to Christianity it received the name of *heligh-monat*, or holy month.

Remarkable Days

In DECEMBER 1819.

*2. 1697.—ST. PAUL'S CATHEDRAL OPENED, Although the building was not finished till 1710. The cost was estimated at £1,000,000. St. Paul's

was first built on the foundation of an old temple of Diana, in 610; burnt 964; rebuilt 1240, having been 150 years building; the steeple fired by lightning 1443; rebuilt, having been in great part burnt down, 1631; totally destroyed by fire, 1666; and the first stone of the present structure laid in 1675.

6.—ST. NICHOLAS.

Nicholas was Bishop of Myra, in Lycia, and died about the year 392. He was of so charitable a disposition, that he portioned three young women, who were reduced in circumstances, by secretly conveying a sum of money into their father's house. Milner, in his History of Winchester, describes a curious font preserved in the cathedral of Winchester, and applies the carvings on it to the life and miracles of this saint. The annual ceremony of the *boy-bishop*, once observed on this day, is described at length in T.T. for 1814, p. 306.

*6. 1718.—NICHOLAS ROWE DIED, ÆT. 44,

One of our best dramatic writers after Shakspeare. His tragedies are frequently composed in a strain of religion and piety, which gives them a species of sanctity not always attaching to those more serious efforts of the muse.

8.—CONCEPTION OF THE VIRGIN MARY.

This festival was instituted by Anselm, Archbishop of Canterbury, because William the Conqueror's fleet, being in a storm, afterwards came safe to shore. The council of Oxford, however, held in 1222, permitted every one to use his discretion in keeping it.

*11. 1732.—JOHN GAY DIED.

Life is a jest, and all things show it;
I thought so once, but now I know it.

It was Gay's last request to Mr. Pope, that these words should be inscribed on his tomb: a remarkable proof, connected with his frequent melancholy and dejection, that no success, either as a poet, a dramatic writer, or a man of the world (and Gay was emi-

nently successful in each of those characters), could either insure his happiness, or divest him of one galling recollection—that he was not in favour at court! though, in truth, his own spleen at a fancied slight received from royalty, had produced his disgrace in that quarter. 'Oh!' says he, 'that I had never known what a court was! Dear Pope, what a barren soil (to me so) have I been striving to make something out of!****It is my hard fate, I must get nothing, write *for* them or *against* them.' Not all the noble additions to his fame, his fortune, and his friendships, procured him by the unrivalled eclat of the 'Beggar's Opera,' could temper his mortification at the rejection of his 'Wife of Bath;' and the success of the 'Beggar's Opera' itself was far from commensurate to the disappointment he experienced on finding that his satire had failed of awing the court into a disposition to take him into favour, in order to keep so powerful a pen in good humour, as he had anticipated.

*12. 1757.—COLLEY CIBBER DIED, ÆT. 86,

Well known as a manager, an actor, and a dramatic writer. We are most indebted to him for finishing Vanburgh's 'Journey to London,' under the title of 'The Provoked Husband.'—See March 26.

*12. 1816.—NOWHER DIED.

This interesting youth was a native of New-Zealand, who, from an acquaintance with the missionaries sent thither from this country, became a convert to Christianity; and, subsequently, having entered himself a common sailor on board the Jefferson whaler, arrived in London during the spring of 1816. He was immediately taken care of by the Church Missionary Society; and great expectations were formed of his usefulness in a mission with which he was about to be entrusted, when he died of a malignant putrid fever, at Paddington. A funeral sermon was preached by the Rev. Basil Wood, of

that place, out of respect to his memory, on the 12th of January, 1817.

13.—SAINT LUCY.

This virgin martyr was born at Syracuse. She refused to marry a young man who paid his addresses to her, because she had determined to devote herself to religion, and, to prevent his importunities, gave her whole fortune to the poor. The youth, enraged at this denial, accused her before Paschasius, the heathen judge, of professing Christianity; and Lucy, after much cruel treatment, fell a martyr to his revenge, in the year 305.

*13. 1769.—C. T. GELLERT DIED.

The 'amiable' Gellert is best known in England by his interesting '*Letters*.' In his own country, among the many flattering instances of public approbation which his works in general, and his 'Tales and Fables' more particularly, produced, Gellert was chiefly pleased with that of a Saxon peasant. One day, about the beginning of winter, he saw a man drive up to his door a cart loaded with firewood. Observing Gellert, he asked him whether he was the gentleman who wrote such fine tales. Being answered in the affirmative, he begged pardon for the liberty he took, and left the contents of his cart, being the most valuable present he could make.

Gellert was a man of the easiest and most conciliating manners; pleasing even to strangers; and of a disposition to form and preserve the most valuable friendships. He was open and enthusiastic in his attachments, ready at all times to give his counsel, labour, and money, to serve his friends. In himself, of a timid and hypochondriac habit, and disposed to criticise both his own character and works with a severity of which his friends could not acknowledge the justice. He had a constitutional fear of death, which, notwithstanding, receded as the hour of trial approached; so that he died with calmness and

fortitude. In this he is thought to have resembled our Dr. Johnson, but, in other respects, his character and habit seem to approach nearer to those of Cowper. He was an agreeable and fertile writer, the poet of religion and virtue, and an able reformer of public morals. He aimed also at the reformation of the stage, and wrote several plays of the best moral tendency.

*15. 1683.—IZAAK WALTON DIED,

During the great frost, for which that year was remarkable. His 'Complete Angler' will ever be read with pleasure by those even who have no taste for that pursuit, for its delightful pictures of rural scenery, and its unfeigned piety.

INSCRIPTION *on his* TOMB.

Alas! he's gone before,
Gone to return no more;
Our panting breasts aspire
After their aged sire,
Whose well spent life did last
Full *ninety* years and past;
But now he hath begun
That which will ne'er be done;
Crowned with eternal bliss,
We wish our souls with his.

*15. 1810.—MRS. TRIMMER DIED,

A lady who did much for the present and for future generations, by her works of instruction in moral and religious knowledge. She sank into death as into a sleep, while sitting in her chair at her meditations.

16.—O SAPIENTIA.

This is the beginning of an anthem in the Latin service to the honour of Christ's advent, which used to be sung in the church from this day until Christmas Eve.

21.—SAINT THOMAS THE APOSTLE.

Thomas, surnamed *Didymus*, or the Twin, was a Jew, and in all probability a *Galilean*. There are but few passages in the gospel concerning him. Thomas

is said to have suffered martyrdom in the same city, being killed by the lances of some people instigated by the Bramins.

This is the shortest day, and is, at London, 7 h. 44 m. 17 s.; allowing 9 m. 5 s. for refraction.

25.—CHRISTMAS DAY.

Much of the festivity of this season, which formerly gladdened the hearts of the old and young, has now disappeared; a refinement of manners (with little real improvement we fear), and the increasing difficulties of the times, have, we are sorry to say, in a great measure abolished the hospitality of our forefathers. May the following lines, and the subsequent reflections (taken from a periodical print), have some effect in restoring good old customs!

> —Frame your mind to mirth and merriment,
> Which bars a thousand harms, and lengthens life.
>
> SHAKSPEARE.

> Why, gentlemen, doe you know what you doe, ha?
> Would you ha' kept me out? *Christmas*, old *Christmas*?
>
> BEN JONSON.

> Read them, and when your faces shine
> With buxom meat and capering wine,
> Remember us in cups full crowned,
> Until the fired chesnuts leap
> For joy.
> Then as ye sit about your embers,
> Call not to mind those fled *Decembers*,
> But think on these that are to appear,
> As daughters to the infant year;
> And thus throughout, with Christmas plays,
> Frolic the full twelve holidays.

'Up, then, up, lovers of old English pleasures as well as freedom;—lovers of what the SHAKSPEARES and SYDNEYS loved, and what helped to make them the great men they were,—lovers of manly and rural sports, lovers of the freesward and the snow-ball, lovers of song and dance, lovers of mutual happiness in-doors and out of doors, lovers of Nature, and of the Author of the flowers of summer-time and the evergreens of winter. Up, and do what you can, and

what you ought. You, who are able, do as the old gentry did, and set your village neighbours in motion with cakes and ale; you, who are able, go out and fetch home your boughs, your laurels, your misletoe, your glad holly with its shining winter cheeks,

Till Birnam-wood do come to Dunsinane;

and you, who are not (very few of you, ye rogues), rouse as much mirth as possible nevertheless in doors; study your books, or your good old grandmothers, and revive as many sports, and make them last as many days, as you can. Do not be always plodding and getting; you see what others have got by it,—no ideas, no enjoyments, and the bile. Get enough to live by, but not to die by; and, above all, do honour to the memory of merry old England this week, till you hear more about her the next.'

We cannot do better than close these remarks with a Christmas carol, held to be the most antient drinking song, composed in England, extant. The original is in the old Norman French, of which, as well as of the translation, we annex a specimen:—

Seignors ore entendez a nus,
De loinz sumes venuz a wous,
Pur quere Noel;
Car lern nus dit que en cest hostel
Soleit tenir sa feste anuel
A hi cest jur.

Lordlings, from a distant home,
To seek old Christmas are we come,
Who loves our minstrelsy:
And here, unless report mis-say,
The greybeard dwells; and on this day
Keeps yearly wassel, ever gay,
With festive mirth and glee.

Lordlings, list, for we tell you true;
Christmas loves the jolly crew
That cloudy care defy:
His liberal board is deftly spread
With manchet loaves and wastel-bread;
His guests with fish and flesh are fed,
Nor lack the stately pye.

Lordlings, it is our host's command,
And Christmas joins him hand in hand,
To drain the brimming bowl;
And I'll be foremost to obey:
Then pledge me, sirs, and drink away,
For Christmas revels here to-day,
And sways without controul.

Now *wassel* to you all! and merry may ye be;
But foul that wight befall, who *drinks* not *health* to me!

The feast of our Saviour's nativity was undoubtedly celebrated in the early ages of Christianity; for we are told that, under the persecution of Maximinus, that emperor burnt a church at Nicomedia, which was filled with Christians assembled to keep this festival. St. Gregory terms it the *festival of festivals*; and St. Chrysostom, the *chief of all festivals*. It is named *Christmas-day*, from the Latin *Christi Missa*, the Mass of Christ, and thence the Roman Catholic Liturgy is termed their *Missal* or *Mass Book*. About the year 500, the observation of this day became general in the Catholic church.

In the primitive church, Christmas-day was always preceded by an eve or vigil. When the devotion of the Eve was completed, our forefathers used to light up candles of an uncommon size, which were called Christmas candles, and to lay a log of wood upon the fire, called the *yule-clog* or log.

For many other customs formerly observed in England at this season, see T.T. for 1814, pp. 309-315; T.T. for 1816, p. 337; and for an account of the strange and ridiculous '*Ass's Feast*,' formerly celebrated in this country at Christmas, consult T.T. for 1815, p. 318.

26.—SAINT STEPHEN.

Stephen was the first deacon chosen by the apostles. He was cited before the Sanhedrin, or Jewish Council, for prophesying the fall of the Jewish Temple and economy; and while vindicating his doctrine by several passages of the Old Testament, he was violently carried out of the city, and stoned to

death, in the year 33.—See *Acts* vii, for his admirable defence.

We know not whether we shall give offence to our catholic friends by the admission of the following *jeu d'esprit;* it is, however, so appropriate to the occasion on which it was written, that we cannot refuse our protestant readers the perusal of this choice *morçeau,* hitherto only privately printed and circulated. Let those who are of opposite sentiments receive it with a smile of good humour, forgive the author, and forget the satire. It was written in consequence of the decision of the House against the Catholics, by the single vote of the late Speaker, the *Hon. Charles Abbot* (now Lord Colchester). It is entitled 'THE ABBOT OF ST. STEPHEN,' and may, we believe, be sung to the tune of '*Three Friars of Orders Grey.*'

1.

Saint Stephen he looked on his antient chair,
And he smiled to see what an ABBOT was there;
When Popery came,
With her mischievous flame,
Contriving the doom
Of that TRIPLE the PLUME,
This *Abbot* he spoke
And the juggle was broke;
Through the Calendar now let her pray to the rest,
But Stephen for England of saints was the best.
Then hail to the *Abbot* of Saint Stephen,
Sound we his praise from morn to even.
No begging monk, or mumping friar,
No droning priest, or lazy prior,
Can rule so well in his convent choir,
As the *Abbot* of Saint Stephen.

2.

Harry the Eighth—Heaven bless his hand!
Hunted the crew from English land:
He plucked the cowls
From their pampered jowls;
Saint Francis he stript,
And *Saint Dominic* clipt,
Their talons he pared,
But Saint *Stephen* he spared,

And kept him at home while he scouted the rest,
For the *Abbot* of Stephen was always the best.
Then hail to the Abbot of Saint Stephen, &c. &c.

3.

High in the chair this *Abbot* is placed,
And never was chair so guarded and graced:
At Popery sly
He sharpened his eye;
In the moment of need,
Without relic or bead,
Book, candle, or bell,
In Saint Stephen's chappell,
Our altar and throne he relieved from her pest;
And good Father Charles is of Abbots the best.
Then hail to the Abbot of Saint Stephen, &c. &c.

27.—JOHN EVANGELIST.—*See p.* 143.

28.—INNOCENTS.

The slaughter of the Jewish children, by Herod, is commemorated on this day. The festival is very antient, for Tertullian and Saint Cyrian call these Innocents martyrs, and Prudentius has written a hymn upon the subject. *Childermas*-day is another name for this feast.

*28. 1817.—DR. CHARLES BURNEY DIED.

Dr. Burney is the second luminary in that bright constellation of learning formed by PORSON, PARR, and himself, that has now disappeared from our view. His family have all been conspicuous: his father, the historian of music, and friend of Johnson, was one of the most elegant writers of that age; his brother, Captain Burney, who accompanied Cook in his two last voyages, is one of the first geographers the country possesses; and Mad. D'Arblay, his sister, has equally distinguished herself by her well-known writings.

31.—SAINT SILVESTER.

He was Bishop of Rome; and succeeded Miltiades in the papacy, in 314. Silvester is accounted the author of several rites and ceremonies of the Romish church, as asylums, unctions, palls, corporals, mitres, &c. He died in 334.

Astronomical Occurrences

In DECEMBER 1819.

THE Sun enters Capricornus at 5 m. after 3 in the afternoon of the 22d of this month, and he rises and sets as in the following table during the same period.

TABLE

Of the Sun's Rising and Setting for every fifth Day.

December 1st,	Sun rises	57	m.	after	7.	Sets	3	m.	after	4
6th,	- - -	1	- -		8	-	59	- -		3
11th,	- - -	5	- -		8	-	55	- -		3
16th,	- - -	7	- -		8	-	53	- -		3
21st,	- - -	8	- -		8	-	52	- -		3
26th,	- - -	7	- -		8	-	53	- -		3
31st,	- - -	5	- -		8	-	55	- -		3

Equation of Time.

From the apparent time as indicated by a good sun-dial, if the quantities be subtracted in the first five lines of the following table, or added to that time in the other instances, the results will be the mean time answering to the same epochs.

TABLE.			m.	s.
Wednesday - Dec. 1st,	From the time by the dial *subtract*		10	56
Monday - - - - - 6th,	- - - - - - - - - - - - - -		8	57
Saturday - - - - - 11th,	- - - - - - - - - - - - - -		6	44
Thursday - - - - 16th,	- - - - - - - - - - - - - -		4	21
Tuesday - - - - - 21st,	- - - - - - - - - - - - - -		1	52
Sunday - - - - - 26th,	To the time by the dial *add*		0	38
Friday - - - - - - 31st,	- - - - - - - - - - - - - -		3	5

Phases of the Moon.

Full Moon -	1st day, at	11	m.	after	6	evening.
Last Quarter	9th, - - -	29	- -		8	- - -
New Moon -	17th, - - -	53	- -		5	morning.
First Quarter	23d, - -	44	- -		9	evening.
Full Moon -	31st, - -	6	- -		11	morning.

Moon's Passage over the Meridian.

The Moon will pass the first meridian of this country at the following times during this month; which will afford good opportunities for observation, if the weather prove favourable: viz.

December 8th,	at 7 m.	after 5	in the morning.
9th,	48	5	
10th,	28	6	
11th,	7	7	
12th,	48	7	
13th,	32	8	
21st,	16	4	in the evening.
22d,	6	5	
23d,	53	5	
24th,	38	6	
25th,	24	7	
26th,	11	8	
27th,	59	8	
28th,	51	9	
29th,	44	10	

Phase of Venus.

Dec. 1st	Enlightened part	11·70688 digits.
	Dark part	0·29312

Eclipses of Jupiter's Satellites.

There will only be one visible eclipse of each of Jupiter's first and second Satellites this month, which will be as follows:

EMERSIONS.

1st Satellite 15th day, at 58 m. after 4 in the evening.
2d Satellite 2d day - 8 - - 5

Form of Saturn's Ring.

Dec. 1st	Conjugate axis	0·033
	Transverse ditto	1·000

Other Phenomena.

Mercury will attain his greatest elongation on the 5th of this month; he will also be stationary on the 13th; and be in his inferior conjunction at 6 in the

morning of the 23d. Mars will be stationary on the 7th. Saturn will be in quadrature at 1 in the morning of the 17th; and Georgium Sidus in conjunction at 45 m. after 9 in the morning of the same day. The Moon will be in conjunction with β in Taurus at 42 m. after 4 in the evening of the 2d; with Pollux at 6 m. after 3 in the morning of the 5th; and with Spica in Virgo at 29 m. after 3 in the afternoon of the 12th. There will also be an occultation of the star marked α in Scorpio: the immersion will take place at 16 m. past midnight on the 15th, and the emersion at 53 m. after the same epoch; at the former of these times the star will be 7¾′ north of the Moon's centre, and at the latter 9′ north of the same point.

On the EFFECTS *of* GRAVITATION.

[Concluded from p. 295.]

That the effects of gravity are not merely confined to the Earth, and what are generally denominated heavy bodies, but extend to all surrounding matter, was first proved by the experiments of Galileo and Torricelli; by whom it was shown that the pressure of the atmosphere, like that of other bodies, was derived from the principle of gravitation. This discovery banished the idea of absolute levity from the mind of the philosopher, and convinced him that those bodies which ascend in the air rise for the same reasons as cork floats in water, or lead in quicksilver; and, consequently, that the difference of the intensities with which bodies gravitate towards the Earth, is the sole cause of this phenomena. The same power also forms such an indissoluble connexion between the Earth and its atmosphere, that the latter invariably participates in all the motions of the former; and by that means not only renders us altogether insensible of these motions, but prevents

those direful effects that must result from the want of such an inseparable union. Were the influence of gravity upon the terrestrial atmosphere suspended but for one moment, and all that is fair in terrestrial creation, or most magnificent in the works of man, would be levelled with the dust; for the one being thus rendered stationary while the motion of the other was continued, a universal wind would instantly take place, in comparison with which the most violent hurricanes of nature are mere zephyrs.

All that we know of force relates to its *quantity* and *duration;* and when we are convinced by observation of natural phenomena, that they proceed from powers that coincide in these respects, there is sufficient reason to conclude, that these phenomena result from the same or a similar cause. The observations of astronomers show that the Moon is constantly deflected from a rectilineal path, and caused to describe a curve concave towards the Earth. But as this movement does not describe an exact circle, the Moon sometimes approaches the Earth, and at others recedes from it, during each of her revolutions; and experience proves, that during the former of these periods her motion is accelerated, and in the latter it is retarded; and hence the analogy between these effects and those which are constantly observed with respect to terrestrial bodies, leads to the inevitable conclusion that the power which produces them acts in the same direction. The analogy, however, does not stop here; for when the variation of gravity, which universal experience establishes with respect to terrestrial bodies, is supposed to extend to the Moon, an exact coincidence is found to subsist, not only with respect to the direction, but also with regard to the intensity of the force and the distance of the attracting body. It is therefore equally consonant with the dictates of common sense and the principles of true philosophy to conclude

that the cause which produces these effects is the same.

The force of gravity at the Earth's surface may be compared with the centripetal force which causes the Moon to revolve about the Earth, and the result establishes the identity of the attracting power in the most perspicuous and satisfactory manner.

Let r denote the radius of the Earth; v the velocity which a heavy body acquires near the Earth's surface in the first second of its vertical descent; also let d denote the distance of the Moon from the Earth; t the time of the Moon's periodic revolution in seconds; and v' her velocity in her orbit. Then, writers on physical astronomy prove that

$$dv'^2 = r^2 v,$$

and therefore

$$v' = r\sqrt{\frac{v}{d}}.$$

Now the circumference described by the Moon (supposing her orbit circular) is $2\pi d$, where $\pi = 3{\cdot}1416$; and this divided by v', gives the periodic time of the Moon in seconds; we have therefore

$$\frac{2\pi d}{r}\sqrt{\frac{d}{v}} = t;$$

hence, by squaring both sides,

$$\frac{4\pi^2 d^3}{r^2 v} = t^2,$$

and

$$\frac{d^3}{r^2} = \frac{t^2 v}{4\pi^2}.$$

Dividing both sides of the equation by r, we have

$$\frac{d^3}{r^3} = \frac{t^2 v}{4\pi^2 r},$$

and

$$\frac{d}{r} = \left(\frac{t^2 v}{4\pi^2 r}\right)^{\frac{1}{3}}.$$

Now as v, r, and t, are all known, the ratio of d to r, or the value of $\frac{d}{r}$, is also known. But this is the ratio of the Moon's distance to the radius of the Earth; and as this ratio may also be found from the Moon's parallax, if these two ratios, derived from different principles, be the same, it will evidently follow that the force which acts on the Moon is that of terrestrial gravity diminished in the inverse ratio of the square of the distance.

Now the values of these letters are

$$v = 32{\cdot}166 \text{ feet}$$
$$r = 20887676{\cdot}4 \text{ feet}$$
$$t = 2360591{\cdot}5 \text{ seconds},$$

and by substituting these values in the preceding formula, we obtain

$$\frac{d}{r} = 60{\cdot}218.$$

Now the mean equatorial parallax of the Moon has been found by observation to be 57′ 11″·4, from which the mean distance of the Moon from the Earth in equatorial semi-diameters is found to be 60·121.

It is, however, in mean semi-diameters of the Earth that the distance of the Moon is found by the above formula, and therefore to reduce this last result to the same scale, before they can be compared together, we must increase it by $\frac{1}{300}$th part, that being about the ratio in which the equatorial semi-diameter exceeds the mean radius, and which brings it to 60·221; and this only differs from the former result by the small fraction ·003 of the Earth's radius, or less than a twenty thousandth part of the whole distance. Thus it is proved, by combining the theory of gravity with the time of the Moon's sidereal revolution and the observation of her parallax, that it is the same force which retains the Moon in

her orbit, and produces all the terrestrial phenomena we have described.

Since the Moon is retained in her orbit by the force of terrestrial gravity, while she with the Earth gravitates towards the Sun, and both together revolve round that central body, the various positions in which these three bodies are placed, causes not only the directions, but the intensities of their attractions upon the Moon to vary. And the disturbances which this variation produces in her motion likewise extend to all the planets, since each is acted upon by all the rest, as well as by the Sun, about which it revolves. The theory of the disturbances of the planetary motions is one of the most important and difficult branches of physical astronomy; for not only the magnitudes and directions of the disturbing forces are to be determined at every point of the planets' orbit, but also the accumulated effects which they produce through long periods of time.

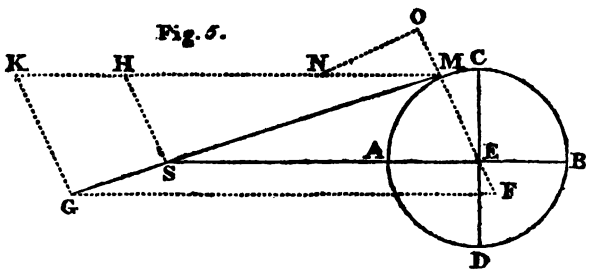
In prosecuting these investigations, it has been necessary to resolve problems of the most intricate nature, and which required all the resources of modern analysis, extended as these have been by the fluxional and integral calculus, to surmount the difficulties they presented. The labours of the most eminent mathematicians, however, have been exerted on this subject, and their investigation crowned with the most complete success, not only in showing that every irregularity in the planetary motions can be explained by the single principle of universal gravitation, but in determining the position of any of the heavenly bodies at any given instant of time. Difficult, however, as these researches are, the conclusion to which they have conducted is perhaps the noblest triumph which science can boast: for having proved that *all* these inequalities in the planetary motions, various and irregular as they may appear, are periodic, it follows that the *stability* of the whole system is secured.

It would be impossible for us, in a work of this nature, to exhibit the scientic processes by which these irregularities in the planetary motions are explained, and their general cause investigated, and by which the effects of universal gravitation are completely developed; we shall therefore select one instance as an example of the rest, as exemplified in the Sun's action upon the Moon. This indeed is much simpler than the action of the planets upon each other; but the general method of resolving the action of gravity into forces acting either in the direction of the radius vector, or at right angles to it, may be adopted in them all. The solution of the problem relative to the force by which the Sun disturbs the motion of the Moon round the Earth is given with so much elegant simplicity by *Professor Playfair*, in the article Physical Astronomy, in the Supplement to the *Encyclopædia Britannica*, that we shall not hesitate to adopt it.

'The motion of the Moon round the Earth is disturbed by the action of the Sun; the gravity of the Moon to the Earth is increased at the quadratures, and diminished at the syzygies; and the areas described by the radius vector, except near these four points, are never exactly proportional to the times.'

'Let ADBC (Fig. 5) be the orbit, nearly circular, in which the Moon revolves, in the direction CADB, round the Earth.

Fig. 5.



Let S be the Sun; and SE, the radius of the Earth's

orbit, be taken to represent the force with which the Earth gravitates to the Sun. Then

$$\frac{1}{SE^2} \cdot \frac{1}{SM^2} :: SE : \frac{SE^3}{SM^2} =$$

the force by which the Sun draws the Moon in the direction MS. Take

$$MG = \frac{SE^3}{SM^2},$$

and let the parallelogram KF be described, having MG for its diagonal, and having its sides parallel to EM and ES. The force MG may be resolved into the two MF and MK, of which MF, directed towards E, the centre of the Earth, increases the gravity of the Moon to the Earth, and does not hinder the areas described by the radius vector from being proportional to the times.'

'The other force MK draws the Moon in the direction of the line joining the centres of the Sun and the Earth. It is, however, only the excess of this force above the force represented by SE, or that which draws the Earth to the Sun, which disturbs the relative position of the Moon and the Earth. This is evident; for if KM were just equal to ES, no disturbance of the Moon relatively to the Sun could arise from it. If, then, ES be taken from MK, the difference HK is the whole force in the direction parallel to SE, by which the Sun disturbs the relative position of the Moon and the Earth. Now, if in MK, MN be taken equal to HK, and if NO be drawn perpendicular to the radius vector EM produced, the force MN may be resolved into the two, MO and ON; the first lessening the gravity of the Moon to the Earth, and the second, being parallel to the tangent of the Moon's orbit in M, accelerates the Moon's motion from C to A, retards it from A to D, and so alternately in the other two quadrants.'

'Thus, the whole solar force directed to the centre of the Earth is composed of the two parts MF and

MO, which are sometimes opposed to one another, but which never affect the uniform description of the areas about E. Near the quadratures, the force MN vanishes, and the force MF, which increases the gravity of the Moon to the Earth, coincides with CE or DE. As the Moon approaches the conjunction at A, the force MO prevails over ME, and lessens the gravity of the Moon to the Sun. In the opposite point of the orbit, when the Moon is in opposition at B, the force with which the Sun draws the Moon is less than that with which he draws the Earth, so that the effect of the solar force is to separate the Moon and the Earth, or to increase their distance; that is, it is the same as if, conceiving the Earth not to be acted on, the Sun's force drew the Moon in the direction from E to B. This force is negative, therefore, in respect of the force A, and the effect in both cases is to draw the Moon from the Sun in a direction perpendicular to the line of the quadratures.'

ERRATUM

In the Volume for 1818.

Page 195, line 12, for Scorpio *read* Virgo.

The Naturalist's Diary

For DECEMBER 1819.

Now bleak DECEMBER chills with icy hand
The drooping features of the lingering year,
And warns the wildered wanderer of home.

RAIN and wind are now extremely prevalent, and, as the frost seldom sets in till the latter end of December, this month may be reckoned the most unpleasant of the whole year. Its gloomy character and soul-chilling effects, often applicable to its precursor, *November*, are well pourtrayed in the following little poem, by MALLETT:—

A Winter's Day.

Written in a State of Melancholy.

Now, gloomy soul! look out—now comes thy turn;
With thee behold all ravaged nature mourn.
Hail the dim empire of thy darling night,
That spreads slow-shading o'er the vanquished light.
Look out with joy; the ruler of the day
Faint, as thy hopes, emits a glimm'ring ray;
Already exiled to the utmost sky,
Hither, oblique, he turned his clouded eye.
Lo! from the limits of the wintry pole
Mountainous clouds in rude confusion roll;
In dismal pomp, now hov'ring on their way,
To a sick twilight they reduce the day.
And, hark! imprisoned winds, broke loose, arise,
And roar their haughty triumph through the skies,
While the driv'n clouds, o'ercharged with floods of rain,
And mingled lightning, burst upon the plain.
Now see sad earth—like thine her altered state,
Like thee she mourns her sad reverse of fate!
Her smile, her wanton looks—where are they now?
Faded her face, and wrapt in clouds her brow!
No more th' ungrateful verdure of the plain,
No more the wealth-crowned labours of the swain;
These scenes of bliss no more upbraid my fate,
Torture my pining thought, and rouse my hate;
The leaf-clad forest and the tufted grove,
Erewhile the safe retreats of happy love,
Stripped of their honours, naked now appear;
This is, my soul! the winter of their year:
The little noisy songsters of the wing,
All shiv'ring on the bough, forget to sing.
Hail, rev'rend silence! with thy awful brow,
Be music's voice for ever mute—as now;
Let no intrusive joy my dead repose
Disturb—no pleasure disconcert my woes.
In this moss-covered cavern hopeless laid,
On the cold cliff I'll lean my aching head,
And, pleased with Winter's waste, unpitying see
All nature in an agony with me.
Rough rugged rocks, wet marshes, ruined tow'rs,
Bare trees, brown brakes, bleak heaths, and rushy moors,
Dead floods, huge cataracts, to my pleased eyes—
(Now I can smile)—in wild disorder rise;
And now, the various dreadfulness combined,
Black Melancholy comes to doze my mind.

See! night's wished shades rise spreading through the air,
And the lone hollow gloom for me prepare!
Hail, solitary ruler of the grave!
Parent of terrors! from thy dreary cave!
Let thy dumb silence midnight all the ground,
And spread a welcome horror wide around.—
But, hark!—a sudden howl invades my ear!
The phantoms of the dreadful hour are near!
Shadows from each dark cavern now combine,
And stalk around, and mix their yells with mine.
Stop, flying Time! repose thy restless wing;
Fix here—nor hasten to restore the spring:
Fixed my ill fate, so fixed let winter be—
Let never wanton season laugh at me.

But every medal has its reverse. Whatever inconvenience may be experienced from the cold and gloomy days and long nights of winter, all is compensated by the cheerful blaze of the evening fire with the social circle around it. MILTON, in an exquisite sonnet, addressed to his friend LAWRENCE, adds this pleasing testimony to the attractions of a fire-side:—

LAWRENCE, of virtuous father virtuous son,
Now that the fields are dank, and ways are mire,
Where shall we sometimes meet, and by the *fire*
Help waste a sullen day,—what may be won
From the hard season gaining? Time will run
On smoother, till Favonius re-inspire
The frozen earth, and clothe in fresh attire
The lily and rose, that neither sowed nor spun.

What neat repast shall feast us, light and choice,
Of Attic taste, with wine, whence we may rise
To hear the lute well-touched, and artful voice
Warble immortal notes and Tuscan air?
He who of these delights can judge, and spare
To interpose them oft, is not unwise.

An evening fire-side by twilight is thus well described in the *Reflector*:—'How observed with the smallest effort is every trick and aspect of the fire! A coal falling in,—a fluttering fume,—a miniature mockery of a flash of lightning,—nothing escapes the eye and the imagination. Sometimes a little flame

appears at the corner of the grate like a quivering spangle; sometimes it swells out at top into a restless and brief lambency; anon it is seen only by a light beneath the grate, or it curls around one of the bars like a tongue, or darts out with a spiral thinness and a sulphureous and continued puffing as from a reed. The glowing coals meantime exhibit the shifting forms of hills, and vales, and gulfs,—of fiery Alps, whose heat is uninhabitable even by spirit; or of black precipices, from which swart fairies seem about to spring away on sable wings;—then heat and fire are forgotten, and walled towns appear, and figures of unknown animals, and far-distant countries, scarcely to be reached by human journey; —then coaches, and camels, and barking dogs as large as either, and forms that combine every shape and suggest every fancy;—till at last, the ragged coals tumbling together, reduce the vision to chaos, and the huge profile of a gaunt and grinning face seems to make a jest of all that has passed.

'The entrance of a single candle dissipates these scenes of fancy in an instant, and the dreamer is summoned to his *tea*.

> Now stir the fire, and close the shutters fast,
> Let fall the curtains, wheel the sofa round;
> And while the bubbling and loud-hissing urn
> Throws up a steamy column, and the cups,
> That cheer but not inebriate, wait on each,
> So let us welcome peaceful evening in.

'Ever since *tea* has been known, its clear and gentle powers of inspiration have been acknowledged, from Waller paying his court at the circle of Catharine of Braganza, to Dr. Johnson receiving homage at the parties of Mrs. Thrale. The former, in his lines upon hearing it 'commended by her Majesty,' ranks it at once above myrtle and laurel, and her Majesty, of course, agreed with him:—

> Venus her myrtle, Phœbus has his bays;
> *Tea* both excels, which she vouchsafes to praise,

The *best of queens*, and best of herbs, we owe
To that bold nation, which the way did show
To the fair region, where the sun does rise,
Whose rich productions we so justly prize.
The Muse's friend, *Tea*, does our fancy aid,
Repress those vapours which the head invade,
And keeps that palace of the soul serene,
Fit, on her birth-day, to salute the Queen.

'They who prefer *coffee* will be pleased to see that their favourite beverage has not been left unnoticed by the poets:—

For, lo! the board with cups and spoons are crowned,
The berries crackle, and the mill turns round:
On shining altars of japan they raise
The silver lamp; the fiery spirits blaze;
From silver spouts the grateful liquors glide,
And China's earth receives the smoking tide:
At once they gratify the scent and taste,
And frequent cups prolong the rich repast.
Straight hover round the fair her airy band;
Some, as she sipped, the fuming liquor fanned;
Some o'er her lap their careful plumes displayed,
Trembling, and conscious of the rich brocade.

'It must be acknowledged, however, that the general association of ideas is at present in favour of *tea*, which on that account has the advantage of suggesting no confinement to particular ranks or modes of life. Let there be but a fire-side, and any body, of any denomination, may be fancied enjoying the luxury of a cup of tea, from the *duchess* in the evening drawing-room, who makes it the instrument of displaying her white hand, to the *washer-woman* at her early tub, who, having had nothing to signify since five, sits down to it with her shining arms and corrugated fingers at six. If there be any one station of life in which it is enjoyed to most advantage, it is that of mediocrity,—that in which all comfort is reckoned to be best appreciated, because, while there is taste to enjoy, there is necessity to earn the enjoyment[1].' Having taken our refreshment of tea or

[1] See an ingenious paper in the 'Reflector,' entitled, a 'Day by the Fire,' vol. ii, p. 400.

coffee, or both, we will proceed to enumerate the various appearances of nature in this month of December.

Rain and wind are now extremely prevalent; and, as the frost seldom sets in till the latter end of the month, December may be reckoned the most unpleasant of the whole year. At other times, however, November is better entitled to this appellation, and *ice* and *snow* contribute to give to *Christmas* that union of frost and good cheer which form the usual character of this season.

From the fall of the leaf, and withering of the herb, an unvarying death-like torpor oppresses almost the whole vegetable creation, and a considerable part of the animal, during this entire portion of the year. The whole race of insects, which filled every part of the summer landscape with life and motion, are now either buried in profound sleep, or actually no longer exist, except in the unformed rudiments of a future progeny. Many of the birds and quadrupeds are retired to concealments, from which not even the calls of hunger can force them; and the rest, intent only on the preservation of a joyless life, have ceased to exert those powers of pleasing, which, at other seasons, so much contribute to their mutual happiness, as well as to the amusement of their human sovereign. Their social connections, however, are improved by their wants. In order the better to secure their scanty subsistence, and resist the inclemencies of the sky, they are taught by instinct to *assemble in flocks*, and this provision has the secondary effect of gratifying the spectator with something of novelty and action, even in the dreariness of a wintery prospect.

This reads a moral lesson of no small import to their natural protector, but too often avowed enemy and destroyer, MAN. But his cruelties are not confined to the feathered creation; they are frequently manifested to his own species: at this inclement season, too, such conduct is doubly criminal. Let him

relieve the poor, than create poverty by unjust oppression. How can they who experience all the blessings of competence better express their gratitude to the Great Giver of all good, than by extending their aid to the forlorn cottager, and offering him supplies of firing, clothing, and bedding? In this case, the rich may often be taught a lesson of benevolence by their inferiors. As an instance, we give the following pretty lines by ROBERT BLOOMFIELD:—

Dear boy, throw that icicle down,
And sweep this deep snow from the door:
Old WINTER comes on with a frown;
A terrible frown for the poor.
In a season so rude and forlorn,
How can age, how can infancy, bear
The silent neglect and the scorn
Of those who have plenty to spare?

Fresh broached is my cask of old ale,
Well timed now the frost is set in;
Here's Job come to tell us a tale,
We'll make him at home to a pin.
While my wife and I bask o'er the fire,
The roll of the seasons will prove,
That time may diminish desire,
But cannot extinguish true love.

O the pleasures of neighbourly chat,
If you can but keep scandal away,
To learn what the world has been at,
And what the great orators say!
Though the wind through the crevices sing,
And hail down the chimney rebound,
I'm happier than many a king,
While the bellows blow bass to the sound.

Abundance was never my lot:
But out of the trifle that's given,
That no curse may alight on my cot,
I'll distribute the bounty of Heaven.
The fool and the slave gather wealth;
But if I add naught to my store,
Yet while I *keep conscience in health*,
I've a mine that will never grow poor.

The *flowers* mentioned as continuing in blow in January, of course afford their beauties in this

month. Evergreens, firs, ivy, laurel, and that most beautiful plant the *arbutus*, rich in flowers and fruit at the same time, serve to enliven this dreary month.

The oak, the beech, and the hornbeam, in part, retain their leaves, and the ash its keys. The common holly (*ilex aquifolium*), with its scarlet berries, is now conspicuous; and those dwarfs of the vegetable creation, *mosses*, and the liverwort (*lichen*), now attract our notice.—See T.T. for 1817, p. 358. The redbreast is still heard to 'chaunt his cheerful strain,' and the sparrow chirps.—See our last volume, p. 319.

Towards the end of the month, *woodcock shooting* commences.

Of the snipe (*scolopax gallinago*), which becomes a prey to the fowler in this and the following month, there are more than forty varieties, mostly breeding in Europe, and subsisting on insects. Some of these wild-fowl frequent moors, others delight in swampy bushes, and others in the open fields.—See T.T. for 1816, p. 351.

In this month, those wild animals which pass the winter in a state of torpidity, retire to their hiding places. The frog, lizard, badger, and hedgehog, which burrow under the earth, belong to this class.

The *bat* is now found in caverns, barns, &c. suspended by the claws of its hind feet, and closely enveloped in the membranes of the fore feet. Dormice, squirrels, water-rats, and field-mice, provide a large stock of food for the winter season.

On every sunny day through the winter, clouds of insects, usually called gnats (*tipulæ & empedes*), appear sporting and dancing over the tops of evergreen trees in shrubberies; and they are seen playing up and down in the air, even when the ground is covered with snow. At night, and in frosty weather, or when it rains and blows, they appear to take shelter in the trees.

The farmer is happy to avail himself of a hard frost,

when 'the earth burns frore' and 'cold performs the effect of fire,' or of the sun, to dry the roads, to get the dung-cart, and carry out his manure, ready for the ensuing season of sowing spring corn.

December, with its winds and it storms, its joys and its sorrows, is now passed away, along with the shortest day and the winter solstice; and a scene of renovation, of hope and of joy, opens upon us, which carries us from the contemplation of terrestrial and transitory scenes, to those which are unearthly and endure for ever. These are beautifully typified in the gradual march of the seasons.

Deem we the face
Of *changeful seasons* varied but to charm
The gazing eye, and soothe the vacant mind?
Say, is not NATURE's ample tome displayed,
Even to the careless wanderer in the field,
With loftier purpose? Wisdom's dictates pure,
Themes of momentous import, charactered
By more than human finger, every page
Discloses. HE, who formed this beauteous globe
So fair, amid her brightest scenes hath hung
Fit emblems of a perishable world;
And graved on tablets he that runs may read
Your fickle date, ye sublunary joys,
The buds doth SPRING unfold, and, thick as dew
Spangling the grass, the purple bloom diffuse?
Comes a chill blight, and bids the sanguine youth
Read in its ravages a lore that tells
Of frustrate plans, and hope indulged in vain.
Do SUMMER suns the mead with herbage load,
And tinge the ripening ear? With sudden rage
The thunder-storm descends; the river swells
Impatient, leaps the mound; and, while the waves
Devour the promised harvest, calls on thee,
O Man, to tremble for thy daily bread.
The faded leaves doth AUTUMN scatter wide;
Or WINTER rend the desolated boughs,
And lay the fathers of the forest low?
Child of the dust, attend! To thee they cry,
Each from his whirlwind, '*Earth is not thy home.*'

GISBORNE.

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TO

Time's Telescope

FOR

1819.

*** For the various SAINTS, see the word. The Roman Numerals refer to the INTRODUCTION.

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